S. HRG. 102-29

REPORT OF THE ENVIRONMENTAL PROTECTION AGENCY'S SCIENCE ADVISORY BOARD

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED SECOND CONGRESS

FIRST SESSION

JANUARY 25, 1991

Printed for the use of the Committee on Environment and Public Works

U.S. GOVERNMENT PRINTING OFFICE

40-737 == WASHINGTON : 1991

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

S321-17

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CONTENTS

OPENING STATEMENTS

	Page
Burdick, Hon. Quentin N., U.S. Senator from the State of North Dakota	2
Chafee, Hon. John H., U.S. Senator from the State of Rhode Island	25
Durenberger, Hon. Dave, U.S. Senator from the State of Minnesota	9
Lieberman, Hon. Joseph I., U.S. Senator from the State of Connecticut	7
Metzenbaum, Hon. Howard M., U.S. Senator from the State of Ohio	2
Moynihan, Hon. Daniel Patrick, U.S. Senator from the State of New York	1
Prepared statement	12
Reid, Hon. Harry, U.S. Senator from the State of Nevada	3
Symms, Hon. Steve, U.S. Senator from the State of Idaho	5

WITNESSES

Loehr, Dr. Raymond, University of Texas; chair, EPA Science Advisory Board, and co-chair, Relative Risk Reduction Strategies Committee	17
Prepared statement	59
Reilly, Hon. William K., Administrator, Environmental Protection Agency	15
Prepared statement	45

ADDITIONAL STATEMENT

Chemical Manufacturers Association	79

REPORT OF THE ENVIRONMENTAL PROTECTION AGENCY'S SCIENCE ADVISORY BOARD

FRIDAY, JANUARY 25, 1991

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
WASHINGTON, DC.

The committee met, pursuant to notice, at 9:32 a.m. in room 406, Dirksen Senate Office Building, Hon. Daniel Patrick Moynihan, presiding.

Present: Senators Moynihan, Metzenbaum, Reid, Symms, Lieberman, Chafee, Durenberger, and Smith.

OPENING STATEMENT OF HON. DANIEL PATRICK MOYNIHAN, U.S. SENATOR FROM THE STATE OF NEW YORK

Senator MOYNIHAN. A very good morning to our distinguished witnesses, to our guests, and the gentlemen and ladies at the press table. This is the first meeting of the Committee on Environment and Public Works in the 102d Congress and, very appropriately, it opens with an important appearance by our most distinguished and able Administrator of the U.S. Environmental Protection Agency, William K. Reilly. He will be accompanied by Dr. Raymond Loehr of the University of Texas, formerly of Cornell University.

I have just been told, Mr. Reilly, that you had hoped that Mr. Loehr might give his testimony first. Is that your wish?

Mr. REILLY. I thought that, with your permission, Mr. Chairman, I might say a few words by way of introduction of the effort and how we came to ask for this contribution by the Science Advisory Board, and then simply to lay the report on the record before we get into a discussion of any details that one may wish from it, that he present it.

Senator MOYNIHAN. We will do that, but first we would like to welcome our newest member to the committee, Senator Smith. It's a great pleasure to have you here. I see that Senator Metzenbaum and Senator Symms are also here, and in the pleasant tradition of the committee we will first hear any statements that our committee members might wish to make.

Senator Burdick cannot be here today. He is on other business; the Senate is not in session, so I am presiding instead. He has a statement which I will enter into the record at this point.

[Senator Burdick's statement follows:]

STATEMENT OF HON. QUENTIN N. BURDICK, U.S. SENATOR FROM THE STATE OF NORTH DAKOTA

I am unable to attend today's hearing on the Environmental Protection Agency's "Reducing Risk" report. I have asked the Committee's Ranking Majority Member, Senator Daniel Patrick Moynihan of New York, to chair today's hearing.

EPA Administrator Reilly has been interested in comparative risk as it relates to the Nation's environmental protection priorities. Though considerable data gaps remain, I applaud this recent effort and look forward to continuing work in the comparative risk area. It is my hope that the agency may utlimately prove the scientific validity of its risk assessment and risk management efforts.

Senator MOYNIHAN. Senator, would you like to make some maiden observations?

Senator SMITH. No, Mr. Chairman. I'll just say that I'm very thankful to be on the committee. I appreciate the opportunity to be here to listen to Bill Reilly, and I look forward to working with you and the rest of the committee.

Senator MOYNIHAN. That's very much our view. You will find that this is a very collegial body, excepting when Senator Symms has a highway project in his district—

[Laughter.]

Senator MOYNIHAN. —that he considers to be of national interest.

Senator Metzenbaum.

OPENING STATEMENT OF HON. HOWARD M. METZENBAUM, U.S. SENATOR FROM THE STATE OF OHIO

Senator Metzenbaum: Thank you, Mr. Chairman. I have a few remarks I would like to make.

First I would like to say that I am grateful to Administrator Reilly for being here today to discuss the Science Advisory Board's study on the relative risks of environmental problems and options for reducing the risks.

I am also very happy to see Senator Smith with us, a new addition to our committee. It pleases us much.

I appreciate the premise behind the Science Advisory Board's report. It is a good idea to set national priorities. You can't argue with the facts: we certainly do have limited resources, yet we still face many complex and costly environmental problems. How do we balance these two competing forces?

It makes sense that we want to weigh the ecological and health risks of different environmental problems and try to tackle them according to the dangers they pose. That certainly sounds good, but frankly, I think we all know it may be easier said than done. Even the Science Advisory Board's report acknowledges some of the difficulties in actually ranking environmental risk. The report puts a great deal of emphasis on using science and not public opinion to set environmental priorities, but the report also raises questions about the soundness of scientific data. As you know, page 8 of the report states,

Data on human exposure and the toxicity of many pollutants are seriously deficient. In particular, the lack of pertinent exposure data makes it extremely difficult to assess human health risks.

The report goes on to say,

Great uncertainty often is associated with the data that do exist. Exposure in toxic response models, the numbers used to quantify risk, and variations in individ-

ual susceptibility to risk are often highly uncertain. Without more and better data, conclusions about relative risk will be tenuous and will depend in large measure on professional judgment.

Frankly, I don't think that's very reassuring. The idea that scientists and technicians might use "professional judgment" and not real scientific evidence to decide whether the problems at toxic waste sites, for instance, are of relatively low risk, is troubling. People I know who live near toxic waste sites in Ohio would not be happy to hear that, especially if they believed EPA would be using a ranking system as an excuse to devote less resources to the clean-up of such sites in the future.

I also wonder how EPA plans on coordinating environmental risk assessments with other Federal agencies whose actions affect the environment. For example, the report mentions a serious health risk posed by worker exposure to chemicals in industry and agriculture. Will EPA be able to coordinate its efforts with OSHA and the Department of Agriculture?

I look forward to hearing from our witnesses today. I may have to leave just before 10:30 for another commitment, but I am very interested, and frankly, I want to say in conclusion, Mr. Reilly, I think you have given many signals and taken many steps to make us feel that you do have a commitment to your responsibilities. To that extent, in your efforts to defend the environment, I know this Senator is very supportive of your leadership and willing to help you in every way we can.

Senator MOYNIHAN. Thank you, Senator Metzenbaum.

Senator Reid, welcome to our first hearing of the 102d Congress. We are glad to have you back.

OPENING STATEMENT OF HON. HARRY REID, U.S. SENATOR FROM THE STATE OF NEVADA

Senator REID. Thank you, Mr. Chairman.

I welcome this opportunity to continue our dialogue with the EPA on the role that risk contributes in the decisionmaking process to protect the environment. Especially, Mr. Chairman, I commend you on your initiative for this request to meet with the Administrator and the Chairman of the Science Advisory Board on its report.

I would also like to take a moment to extend a warm welcome to Administrator Reilly, who is one of my favorite endangered species in the Administration. It is always refreshing to have you appear before this committee and to receive your comments.

Also we appreciate the participation of Dr. Loehr, who was responsible for guiding the numerous contributors to the Science Advisory Board report that will be the subject of today's hearing.

The recommendations outlined by the board indicate a concerted effort to consolidate the findings of the 1987 report, entitled "Unfinished Business," and to provide EPA with focused guidance and with a policy perspective. Dr. Loehr and the board are to be commended for this fine contribution, and EPA should be challenged by it.

Mr. Chairman, Administrator Reilly, after his confirmation, took a bold step in setting a course for EPA to order a proactive mode of operation rather than a reactive mode, a progressive mode rather

than a digressive mode. For this he is to be commended, and I am sure that for this he remains frustrated. It takes time to overcome institutional momentum and the flight of quality professionals, and it takes perseverance for an independent agency to endure the constraints of the Administration.

Personally, I hope that the Administrator stays the course and maintains the helm. A renewed sense of pride is evident within EPA which I believe can be ascribed directly to Administrator Reilly and the people around him.

The Science Advisory Board in their report, "Reducing Risk: Setting Priorities and Strategies for Environmental Protection," has defined a framework for EPA to help focus its efforts to protect the environment. Risk assessment methods and risk management techniques have been utilized extensively throughout industry and in the regulatory environment for evaluation and management purposes in dealing with public safety and allocating limited resources. The public's perception of risk and actual risk, however, are not synonymous. This situation has created, and will continue to create, a dilemma in establishing public policy. We all know that the crafting of policy is an inexact form of art at best, much less a science.

Over the course of its existence EPA has focused primarily on health-based activities. In implementing the variety of environmental laws EPA has devoted great attention to the control of by-products of transportation, industrial, and power-generation activities prior to their release to the environment. These efforts have addressed the overall pollution problem as individual problems within discrete media: air, liquid, solid waste. Over the years at the expense of the approach to focus on releases into one medium at the end of the pipeline, waste prevention and waste minimization approaches, consideration of the multi-media waste system and other environmental quality values that deal with protection of ecosystems, biological diversity, and our Nation's natural beauty and heritage were given short shrift.

I believe EPA will face a tremendous challenge in weighing the merits of improving the air quality of a heavily populated and severely polluted area against protecting an unpopulated and heavily stressed ecosystem.

I believe there is a tremendous challenge to weigh the merits of protecting an endangered species with significant economic costs at a time of economic hardship in the region. I believe it is a tremendous challenge to weigh the merits of protecting the natural setting of our parks and wilderness areas by requiring emission reductions over large areas and at specific sources at significant expense.

Fortunately, some of these policy decisions and value judgments have been made for EPA by Congress, but others can be expected to be made by EPA. This may be an appealing opportunity, but certainly will be an unenviable task. It may be necessary in the eyes of may, but it certainly will be unappreciated by some.

I have already expressed my interest in the need to advance the goals of sustainable development and pollution prevention as essential elements in an overall strategy to protect and preserve our natural resources. We can no longer consume and damage our environment and landscape without regard for long-term conse-

quences. On check, we can readily observe the impact of total disregard for public health in the environment of Eastern Europe. While we do not approach this wholesale abuse, we need to keep in mind that we do straddle the line at times.

Mr. Chairman, this hearing affords us an opportunity to understand the motivation of the Science Advisory Board in its refinement of outstanding issues and with its advice to EPA. Also, it is important to hear from Administrator Reilly on his understanding of EPA's mandate and authority to implement some or all of the recommendations contained in the report. Clearly, all of them cannot be addressed at once; however, they can factor into a long-range plan. It would be useful to hear of the likely success and effectiveness of EPA's action.

Mr. Chairman, I congratulate you again on your foresight to hold this, to make this hearing possible, and in bringing these issues to light.

Senator MOYNIHAN. Thank you, Senator Reid.

Senator Symms.

OPENING STATEMENT OF HON. STEVE SYMMS, U.S. SENATOR FROM THE STATE OF IDAHO

Senator SYMMS. Thank you very much, Mr. Chairman.

Mr. Chairman, I join with you in welcoming our new colleague, Bob Smith from New Hampshire, to the committee.

Bob, we look forward to your presence and your input.

Mr. Reilly, welcome, it's always nice to have you here.

I look forward to this hearing on the report of the Science Advisory Board. I had the opportunity to discuss with your predecessor, Lee Thomas, on what appeared to be seriously maladjusted priorities within EPA, both within the budget and the dedicated time and effort in regulation and enforcement. They did not always track with the agency's goal, which is to protect public health and the environment.

I for one, Mr. Chairman, believe that this was largely because Congress has a habit of responding to the perceptions of risk rather than to what modern science tells us to be the real risk. I think it was you, Senator Moynihan, who said in here one day that you would hope that we could legislate on science, not superstition. I laud you for that statement.

The environmental crises that make it on 60 Minutes, however, are far more likely to be the focus of Congress' attention than the ones that don't, even if the former pose relatively little risk and the latter are serious health and safety concerns. That's something that all of us can recognize, but we all have to deal with the perceptions, which become what people believe to be the truth in politics. Oftentimes political decisions are made rather than scientific decisions.

So that's why I strongly applauded Lee Thomas' undertaking the "Unfinished Business" report within EPA. The findings of that report confirmed my worst suspicions: that EPA's priorities need adjusting.

I know that some of my colleagues are worried by this report, fearing that it may cause the EPA to pay less attention to their

particular environmental agenda. Actually, in my opinion, that fear is not anything we need to worry about, and is unfounded. EPA is constrained to uphold the law, no matter how irrational the law may be. There has also been some concern that "Unfinished Business" was the product of a partisan EPA administration. Again, I applaud the decision of our current Administrator, Mr. Reilly, in asking the Science Advisory Board to review the report. In general, the Science Advisory Board's report on reducing risk confirms the indictment of our current environmental priorities that was levied by the "Unfinished Business" report.

The Science Advisory Board has also provided us with some excellent recommendations for how to pull our priorities back on track.

Mr. Chairman, I am anxious to hear not only the Science Advisory Board's explanation of their report, but how the Administration intends to apply the Science Advisory Board's recommendations. As with any translation of academic thought into public policy, the reducing risk recommendations must be applied in a reasonable manner. It does not make sense, for example, to adjust agency budget and regulatory priorities based on risk assessments that the Science Advisory Board also criticizes as being in need of improvement.

I would hope, therefore, that EPA would see the obvious need to focus its attention, first and foremost, on a serious revamping of its current risk assessment procedures. There are statutory authorities in the recent Clean Air Act that provide ample opportunity to do just that.

Finally, Mr. Chairman, I would like to encourage the committee and staff to pay close attention to today's hearing. As I alluded to earlier, it is my personal opinion that the "Unfinished Business" report was more for our use in Congress in determining our legislative priorities than it was, necessarily, for internal EPA consumption. Let us hope that this committee's environmental agenda for the Congress will reflect what science shows to be America's real and pressing environmental concerns.

Mr. Chairman, on a point of parochial interest but an issue that is of national interest, may I take this opportunity to compliment our Administrator and his new Region X director with respect to the biggest Superfund site in the country in Kellogg, Idaho.

We have an opportunity in Kellogg, to demonstrate to the Nation that we can make Kellogg, Idaho one of those thousand points of light. Kellogg, to my colleagues who aren't familiar with it, has a huge Superfund site. There has been a great deal of public controversy in the area, and your new Region X administrator made what I thought was a very helpful statement in saying that the EPA was not looking to litigate this for the rest of the century, but to settle it.

There is a big difference of opinion on how much money it should cost, and I'll have to leave that to others to decide. But I do think that the attitude that has been demonstrated to get this issue settled so that golf courses and motels and other new investments can be made there to compliment the new ski resort would be very helpful. I think that when we analyze what happens to the priorities, trying to move a foot of topsoil off of 21 square miles of

land, it really is not a high risk problem. It is a very low risk, and to do that is so costly that it is really not reasonable. I think that you are on the right track up there, and I would like to offer my assistance to do anything possible to bring that to a speedy resolution. I compliment you for your efforts and wish you the best to get that done.

Mr. Chairman, thank you very much.

Senator MOYNIHAN. Only Senator Symms could turn a toxic waste site into a golf course.

[Laughter.]

Senator MOYNIHAN. Life is hard out in Idaho, but they manage.

Senator SYMMS. Mr. Chairman, I'll invite you to come out and be the first one to play the course, because it's very possible. It's just a matter of taking the correct view of what can be done there, and it can be done.

Senator MOYNIHAN. I'll just settle for those apples you grow out there.

Senator Lieberman, good morning, sir, and welcome to this first hearing of the year.

OPENING STATEMENT OF HON. JOSEPH I. LIEBERMAN, U.S. SENATOR FROM THE STATE OF CONNECTICUT

Senator LIEBERMAN. Good morning and thank you, Mr. Chairman. I want to thank you very much for convening this hearing. In a moment I want to thank you particularly because of the importance of starting with this subject matter, but let me welcome my new colleague, Senator Smith, my neighbor from New Hampshire, and say that I take his presence on this committee to be reassurance that the special environmental concerns of New England will continue to have bipartisan protection here on this committee.

Mr. Chairman, I thank you for convening this hearing as the first hearing of this session for this committee because I can't think of a better place to start. It seems to me that Administrator Reilly has had the foresight and to some extent the guts to take that very important document, "Unfinished Business," to give it to this group of outside experts, and to basically ask them to advise him—and through him, us— on what the big issues are, on what our priorities in environmental protection should be.

All of us here are part of this. We respond to the environmental pressure or crisis of the moment, and this is in everything else that we do. It is healthy and constructive to stand back, or to have others help us to stand back, periodically, and ask whether we're heading in the right direction and to take a look at where we've been and where we should go. Particularly, I think it is critically important to stress that you and this board have framed it in terms of the most important question, which is risk. What are the risks facing America environmentally, and how do we rank them? Which are the most important? Which are less important? And are our priorities here reflecting that ranking of risk?

I believe that this report provides the foundation for a wide-ranging discussion and debate among all of us who are concerned from whatever perspective with America's environment—scientists, environmentalists, regulators, the regulated community, and Members

of Congress. In my opinion, after this debate takes place, we in Congress will really have a better idea about how to determine if our laws really reflect the risks that society is facing.

It seems to me that some of the conclusions of the report may fundamentally affect the way we view environmental problems in the years ahead. For example, the report concludes that human health and ecological issues—more narrowly drawn than traditional environmental issues—cannot really be separated because "over the long term, ecological degradation, either directly or indirectly, degrades human health and the economy."

Now, that's a very profound and important statement which suggests some very clear directions to us.

Of equal importance, I think, is the fact that the report contains some very significant findings about the desired future direction of EPA's role within the structure of the Federal Government. Jonathan Lash, the cochairman of the committee that produced this report, has commented that the study's conclusion "means that EPA has to go beyond being a simple regulatory agency, to become the locus of environmental planning policy and values for this country."

The report concludes that

> Environmental considerations must be an integral part of national policies that affect a whole range of seemingly unrelated, but actually directly related, concerns, such as energy use, agriculture, taxation, transportation, housing, and foreign relations.

In all these policies the report makes clear that environmental considerations must be as important as, if not more important than, any of the other considerations that are brought into play.

I think those are very important conclusions. In our time—it has worried me over the last couple of years that there have been occasions, more than one, where the opposite seems to be happening, where EPA seems to be not playing the dominant role or having as clear a seat at the table when it comes to energy policy, transportation, and agriculture. We see other agencies or the White House unilaterally making judgments in these areas which have fundamental environmental values at stake in them.

I hope this report leads the way or opens the door to EPA being right there at the table, making those decisions.

Finally, the report in many ways asks us in Congress to reexamine some of our traditional approaches to environmental regulation. I think it suggests that we may have come near the end of the so-called "command and control" regulatory approach in which problems are addressed one medium at a time. While this approach over the years has obviously been successful in many ways, we now face many different kinds of problems, some of them smaller and more individual sources of pollution—including, for instance, in households or offices — and some of them larger, international pollution that may require other approaches which focus much more on pollution prevention rather than after-the-fact command and control and punishment, and on economic incentives which, of course, we began to employ in the acid rain provisions of the Clean Air Act.

I personally believe that these pollution prevention and market-based incentives are cost-effective and necessary approaches to en-

vironmental protection which can not only result in a cleaner environment, but also in savings to American industry and a push to American industry to help it compete in the global market by encouraging efficient use of energy and raw materials and stimulating the development of new energy-conscious environmentally-sensitive technologies which people around the world will be wanting to buy.

The short of it all is that I'm very encouraged by this report. I think it raises questions that hopefully we will help answer in the years ahead. I thank the Administrator for his leadership in bringing the report forward, and I thank you, Mr. Chairman, for opening this session with this hearing.

Senator MOYNIHAN. Thank you, Senator.

I think, in the order of arrival, Senator Durenberger is next. Welcome, again, to this first meeting of the committee in this first session of the 102d Congress.

OPENING STATEMENT OF HON. DAVE DURENBERGER, U.S. SENATOR FROM THE STATE OF MINNESOTA

Senator DURENBERGER. Thank you, Mr. Chairman.

Welcome, Bob, and welcome, Bill.

I was just asked by Bob, who is new to this committee, that we pass the bill raising you to cabinet status, and I said that despite the fact that I suggested as long as two and a half years ago, we haven't quite made it for reasons that are obvious to people in this room. I hope we make it one of our priorities along the line of leadership and value issues that Joe was suggesting, that we make that one of our priorities this year to report a bill out of here to the floor or to Governmental Affairs or wherever it comes from.

Senator MOYNIHAN. It would be Governmental Affairs, I think.

Senator DURENBERGER. Mr. Chairman, I want to pick up where Joe Lieberman left off. I may sound like I'm expressing a little note of caution here about the Science Advisory Board, but I think that in picking on the qualifications of the board's report and talking about the values, Joe did much the same thing.

Mr. Chairman, I can only see a part of that board there. I read some of these reports, and I am reminded that you, Mr. Chairman, as a member of the Finance Committee, have been warning us for a number of years about the consequences of the 1981 Tax Act, the 1983 Social Security Act, a variety of things. We all remember so well the 50 to 49 vote in March of 1984 which began the process of presuming there is only so much we can do as a Nation, and therefore all we do here for 365 days every year is move money around from one place to another.

With that as a background, and because of this—I think Joe said earlier in his comments, how do we rank them, how do we rank these priorities—that's not the question I want to raise here. I want to raise, why do we rank them? And probably break my comments into three points.

The first is the methodological point. I don't think we know enough currently to make comparative risk judgments among programs with any high degree of confidence. I think, for example, our models for cancer risk are still in their infancy. We debated this ad

nauseam in February of last year. We know little about the other adverse effects, like birth defects and toxicity, and we know even less about the public's exposure to these hazards.

If I may, I would take the methodological point another step farther and suggest that we don't even have a yardstick on which to compare these various adverse effects. How does one compare the case of cancer that results from benzine exposure to the loss of cognitive function that comes from lead poisoning? Maybe to carry it another step farther, suppose you had an inexpensive cure for cancer but you had nothing for the diminishment of cognitives. How do you factor that in?

How do we set priorities as between ecological values and public health values? What scientific methods do the EPA professionals use to answer these questions?

Suppose EPA had only two programs, one intended to prevent cancer cases caused by radon and another that protected wetlands habitat for the sole purpose of preserving migratory waterfowl. How much would we spend on each program? And which presents the greatest risk?

I would suggest, Mr. Chairman and my colleagues, that those are not questions of science. Answers to these questions are not going to be found in comparative risk assessments because they are questions of values, as pointed out in the qualifications in this report and as Joe referred to earlier. I think they can only be answered by an appeal to public opinion.

It is a mistake in method to pretend that these things can be compared on any dimension other than public opinion, translated into public values.

I am going to extend that point to groundwater protection. The comparative risk studies continue to suggest a low priority for ground water protection programs, like Superfund and the underground storage tank program. It is the counterintuitive result which I think makes this analysis newsworthy.

The agency professionals compare ground water protection to other problems on the dimension of human health effects, and it ranks low because there is low exposure. But it may just be that ground water, to the public, is in a very different dimension. They may see a resource like waterfowl habitat that is valued for reasons other than its current public health impact. And that, I think, is a methodological point.

You can't substitute quasi-scientific comparisons along a single dimension, like cancer risk, for judgments that the public makes that reflect this bundle of different values that we have as a people. So that's my first point.

The second is about equity, and that's at least what it's called in the Science Advisory Board report. The public's evaluation of risk is not like the straight-line calculus of the health service professional. The public is willing to accept relatively small risks, spread evenly, especially if they are voluntary, more readily than they will accept large involuntary risks imposed on a few people, even when the small risks produce more cancer cases. Superfund is, in part, about fairness, and it's not just about public health.

The equity value held by the public, especially—and this is strictly a personal view, and I hope I'm speaking for many more Ameri-

cans than may say it—the equity value that the public in this country holds extends not just to the present; it extends to future generations. To use the ground water that we currently use for drinking water in this country was rain falling during the Revolutionary War. On the average, it's about 200 years old. It is intergenerational. The public health question here is that ground water directly doesn't have a lot of impact on mortality or morbidity statistics because it will be 200 years before today's pollution shows up in a glass of drinking water. But most Americans—again, this is a personal view, and I hope that it is widely held—most Americans don't come to environmental ethic out of a simple concern for public health statistics. I think they are driven by what many of us express as the "save the planet" expression, and I believe their highest value is intergenerational, and I think that most Americans believe in passing on a world that is at least as good as the one they received.

Ground water contamination, in that context, is a violation of their value system, regardless of its current public health impacts.

To date it seems that the comparative risk endeavors of the agency have been somewhat blind—I know the people aren't blind, but it appears that the comparative process is blind to the environmental ethic, that is, the concern for the future that motivates many of us.

My final point, Mr. Chairman, and I apologize for the length of this, is about political strategy. It seems to me there is an explicit assumption in comparative risk assessments that our resources to address environmental problems are limited. This is why I referred in the beginning to your speeches about the 1981 Tax Act and what we seem to have done deliberately.

But anyway, the assumption is that resources are limited; those that address environmental problems are limited the same way all others are limited, and it's a question of properly dividing the pie. I just want to be one who goes on record in this committee as saying that I don't buy that assumption. It does not reflect the way that we make resource allocation decisions in this Government today. The appropriations pie is a lot bigger than the $6 billion that gets appropriated to the EPA every year, and even that $6 billion is more than the agency was getting two years ago.

So it is not, in my book, a zero sum gain as between Superfund and indoor air pollution, for example, and we ought not to structure the discussion as though it is a zero sum approach. It seems to me all that does is undercut Superfund, and invites people to attack the appropriation for Superfund. I would be the first to admit that we could make a lot of improvements in this program, but laying this on Superfund just invites people to take that program on, cut it, and send its commitment to some other areas.

When I was chairman of the Americans for Generational Equity, I faced an awful lot of elderly organizations who insisted that because I was speaking for future generations, that I wanted to cut all the elderly programs for the benefit of children. I said it then and I believed it then, and I believe it now: if we cut out all the money to the elderly, we wouldn't spend it on children. It is not a quid pro quo. If we're going to spend money on children because it's important to spend money on children, we will do that regard-

less of what we're already spending on the elderly because that's really the way our value system works, in my book.

This point, therefore, must extend to the regulatory side. Bill mentions the increasing cost of cleanup, in his testimony, over the next decade. He questions whether the dollars that the private sector will be spending for hazardous waste and underground tank cleanup reflect our sense of priorities. But it seems to me that repealing the requirement that service station owners clean up their leaking tanks would in no way affect private dollars available for ozone depletion or indoor air pollution or drinking water contamination. And even if these are higher priorities, I don't see how they could be used to justify unabated pollution of ground water by gasoline tanks. It's not an equation with a fixed dollar output.

So, Mr. Chairman, those are mainly just words of caution. I'm not sure that our methods are appropriately suited to making these comparisons. I do want to make the point about public values which are reflected in just the way this committee operates from time to time. I understand their frustration with the so-called "available dollars" and so forth, but it seems to me that our strategy to meet needs currently unaddressed should be to expand the pie, not to simply reallocate it.

Thank you.

Senator MOYNIHAN. Thank you as always, Senator Durenberger, for very thoughtful comments.

I have a statement which I would like to place in the record at this point.

[Senator Moynihan's statement follows:]

OPENING STATEMENT OF HON. DANIEL PATRICK MOYNIHAN, U.S. SENATOR FROM THE STATE OF NEW YORK

Mr. Chairman, as we all know, the subject of this hearing is the report "Reducing Risk: Setting Priorities and Strategies for Environmental Protection" prepared by the EPA's Science Advisory Board. This was done at the specific request of Administrator William Reilly, and the work was performed by Dr. Raymond Loehr and 38 of his colleagues.

This hearing doesnot mark the first presentation of this report to the public, but it is the first presentation to the Congress. When this report was issued in September of last year, Mr. Reilly presented it in a talk to the National Press Club. In his remarks he called for: "[a] broad, robust national dialogue on the Science Advisory Board's findings and recommendations—including hearings before the relevant Congressional Committees. . ."

This Committee cannot guarantee a "robust national dialogue," but today's proceedings show that we are willing to do our part. As many here will recall, this hearing was first scheduled for last October but was postponed due to the end-of-session rush we have become accustomed to.

And so to the report. Let no one mistake its significance—its recommendations are not made lightly. This report is the result of 18 months work by a group of highly distinguished scientists. Out of respect for its authors and for their recommendations, the Committee will give this report the consideration it deserves.

(Although I will be the first to acknowledge that such things are irrelevant to our subject matter, I note with some sense of parochial pride that seven of the members of the Relative Risk Reduction Strategies Committee that prepared the report are affiliated with institutions in my State of New York.)

At its most fundamental level, this hearing is not about any particular environmental problem, or any particular bill. It is about a set of ideas. We are discussing matters of environmental philosophy—the fundamental principles we should use in making decisions about matters of environmental protection. If we can come to a consensus on what these principles are to be, future environmental debates will be more rational (and more peaceable) than those to date.

Before we begin to discuss the specific finds of the report, we should clarify our terms. The study of risks we will address here falls into the category of "comparative risk assessment"—that is, which risks are greater and which are lesser. This must be distinquished with the very much more difficult undertaking of "absolute risk assessment," which attempts to estimate the actual risk to a given individual.

We had some experience with the latter during our debate last year regarding emissions of toxic air pollutants. We found ourselves embroiled in unresolvable disputes about what degree of actual risk certain hypothetical persons may experience and whether this was acceptable.

The report before us does not attempt to do this. It is fundamentally an exercise in priority-setting. If it can be said that we have a "national environmental policy", it can only be the sum total of the environmental laws Congress has enacted over the past two decades. In studying the nature of this "national policy", the Board has come upon an interesting pattern. The priorities reflected in our laws have much more in common with the public's perception of environmental risks than they do with a rigorous scientific assessment of these risks. This is not surprising. The question we must confront is whether it is desirable. And what to do if we decide it is not.

Of course, it should not be assumed that the reduction of the total risk is the only factor to consider in making environmental policy. Matters of social equity, for example, must be considered. My colleagues will agree that coal miners in Appalachia will be paying a much higher price for reductions in acid rain than an average citizen. It is also argued that the poor are exposed to pollution much more than the affluent.

Nonetheless, as a principle of government, the prioritization of environmental problems is a sound starting point. As Mr. Reilly has said, this is "common sense." There will be some interest in using the principles laid out in this report to discredit past EPA policies—the agency has not suffered for lack of criticism, and this may lead to more. I submit that such an exercise is of value only in as much as its lessons are relevant to what we should do next.

I would like to call special attention to two of the Board's 10 recommendations. Recommendation no. 3 (page 18 of the report) reads: "EPA should improve the data and analytical methodologies that support the assessment, comparison, and reduction of different environmental risks."

Recommendation no. 10 (page 25) reads: "EPA should develop improved methods to value natural resources and to account for long term environmental effects in its economic analysis."

Taken together, these recommendations make a compelling case for a topic that I have been interested in for some time, which is the commencement of rigorous benefit/cost analysis for environmental laws. We were successful in inserting section 812 in the Clean Air Act Amendments of 1990, which will require the EPA to perform benefit/cost analysis for its clean air regulations.

Of course we know that answers do not come quickly in these matters. Almost three decades ago I became an Assistant Secretary of Labor in the administration of John F. Kennedy, with a nominal responsibility for the work of the Bureau of Labor Statistics, founded in 1884. If there is one thing those brilliant mathematicians and public servants taught me, it is that fashioning economic indicators takes time. It had taken them a half century to learn to measure unemployment. But they were patient and meticulous, and in the end they succeeded. With this success they changed the way we think about an industrial (or post-industrial) society. I have no doubt that it will take quite a long time to develop reliable methodology to assess the costs, and even more difficult, the benefits of environmental regulation. But this is no reason not to begin.

I extend the Committee's sincere thanks to Mr. Reilly, Dr. Loehr, and all of their colleagues that collaborated to produce this report.

I will close on a cautionary note. On February 8, 1989, President Bush addressed a joint session of Congress and gave his first State of the Union Address. In his remarks, he reiterated his commitment to send a clean air bill to Congress. He ended this passage with the statement that: "[t]he time for study alone has passed, and the time for action is now."

I hope there is no tendency to misremember this remark without the word "alone."

Senator MOYNIHAN. I would like to welcome to the committee also Dr. Jay Messer, who is a scientist with the EPA, and continuing a very happy relationship that we've had of having a "science advisor," you might say, on the staff, on loan from the agency.

Let me just very briefly say—Senator Reid, I think, put it—that it is your purpose, clearly set forth in the study here, to become a proactive agency, trying to shape the environmental agenda rather than simply responding to the events and crises as they are perceived.

The study of your Science Advisory Board is called, "Reducing Risk: Setting Priorities and Strategies for Environmental Protection." As Senator Durenberger noted, in the end these are choices. Let me note that today is Friday; Sunday will be the 30th anniversary of the inauguration of John F. Kennedy. President Kennedy used to say—he really did say this; I've heard him say it more than once—"to govern is to choose," and you can't avoid that. To avoid choice is a choice in itself. The question is how to make informed choices and rank the choices that are based on a more informed basis than otherwise.

I would like to hear from you and Dr. Loehr on the point of getting us ready for the kind of regime you envision. I think it is the case, and I would ask the committee to think about this, that the more that choices in public policy are based in science or science research and analysis, the more uncertain they will seem, the more problematic they will seem, because science is basically—and particularly the science of risk—is a matter of probability in which there are no certainties. It is characteristic of pre-scientific modes in any area that, being based basically on magic, they are quite certain. Nobody is as uncertain of something as somebody who knows nothing about it. The more you learn, the more you're not so sure. We had that experience with the Clean Air Act in the last Congress. It was the first legislation which was significantly preceded by an environmental study, the National Acid Precipitation Assessment Program, the largest environmental study of its kind in the world in the history of this subject. It was very troubling to many persons, because having put a half a billion dollars and 10 years of inquiry into the subject, the answers seemed not nearly as clear as they were before the inquiry had been begun. And that will be the repeated experience, and I think we ought to understand that, and the more, then, ought we learn to deal with scientific method and be at ease with it. As Senator Durenberger has noted, we are in a budgetary mode where the easiest thing for this committee or Congress literally is to impose costs on others, having no resources of our own to allocate. We imposed big costs in the clean air bill.

We also did something—and the record should be very clear—we said we would keep track of those costs. We said there would be a benefit cost analysis of the Clean Air Act in all its components, to continue indefinitely; and if we do that, in a quarter century or a half century, we will begin to know something about this subject. If you haven't got a half century or some such, don't get involved.

That is why Mr. Reilly is very much interested in the department, which I do hope we enact this year, that we create a Bureau of Environmental Statistics to begin getting baseline data and carrying them forward. Don't be alarmed by the term "half century." We expect to be around here in a half century. The Bureau of Labor Statistics was founded in 1884. It took them a little more than half a century to learn to measure unemployment, but when

they finally did we knew something we didn't know before, and we knew how to deal with a language in which we discussed those issues of change once the mathematical statistics gave us that information, which is about as much in advance of your testimony as you need—

Senator REID. Mr. Chairman? Would the chairman yield?

Senator MOYNIHAN. I'd be happy to yield.

Senator REID. I, like Senator Metzenbaum, have a prior engagement at 10:30. I've read the statements of the two witnesses. I do have some written questions I would like to submit through the chairman.

[Responses to Senator Reid's questions were not received in time for publication.]

Senator MOYNIHAN. Of course. All Senators should feel free to do so. And the Senators' staff, if the Senators can't be available, if they will do the same.

Senator MOYNIHAN. Mr. Reilly, good morning, sir.

STATEMENT OF HON. WILLIAM K. REILLY, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY

Mr. REILLY. Mr. Chairman, thank you and good morning, members of the committee.

I am tremendously grateful to you for convening this hearing and for the substantial turnout here on the occasion, as you have mentioned, of the first hearing in the new Congress. I recognize this as a somewhat irregular situation in that I asked for the hearing. Let me say that the impulse on which I acted, I think, was one that was suggested just about two years ago this month when you and I had a conversation prior to my confirmation hearing. You made a remark that I have quoted frequently since. You said, "Above all, do not allow your agency to be transported by middle class enthusiasms."

We went on to discuss the importance of basing environmental policy in the United States more on science and of finding ways of building into our decision-making, to our regulations, to our prioritizing systems, scientific analysis and method.

Well, EPA is 20 years old now. I think it is fair to say that we have had, with respect to legislation, in a number of issues that we have addressed, a somewhat episodic relationship in that many of you have mentioned that as issues have risen to a level of concern among the people and received press attention, they have often been responded to with a law. We should not be surprised, or even necessarily discouraged, that the resulting relationship among those laws does not lead to much coherence.

This effort by the Science Advisory Board is intended to get us that coherence. I think it is a profoundly important report. I think it has implications for the future of the Environmental Protection Agency, for the way the environment is dealt with by the Congress and by other agencies of the Government, and for the people.

So I want to talk a little bit about national environmental policy, what it is now, and what it will become — or what we hope it will become—in the future.

I believe that our national environmental policy has to evolve, has to change, in response to our changing or evolving understanding of the environment. We have to take advantage of these past two decades of experience. We have to build on it if we're to protect human health and natural ecosystems over the long term.

Back in 1986, as Senator Symms mentioned, Administrator Lee Thomas asked an EPA task force to identify, and rank to the extent possible, the most important remaining and emerging environmental problems. That was an unusual assignment. EPA employees were being asked to look beyond their narrow programmatic concerns and think about the relative seriousness of different environmental problems. Given the history and given the structure of EPA, I think it's safe to say that was the first time such a question had been posed within the agency.

It was also a formidable assignment. The tools available for comparing vastly different kinds of problems were rudimentary at best, as Senator Durenberger has suggested. Despite those obstacles and the uncertainties, in 1987 EPA produced a report called "Unfinished Business." It ranked 31 environmental problems in four different ways. The report generated considerable discussion within the agency and considerable attention outside it, and it continues to be in widespread demand.

The idea of comparing environmental problems in terms of relative risk seems sensible, but it was not clear or how such an idea should be applied national environmental policy.

I recall reading "Unfinished Business" back then, and one sentence in particular stood out. The report said, "EPA's priorities appear more closely aligned with public opinion than with estimated risk."

I understand that in a democracy like ours, the objective judgments of scientists can never be the sole basis for public policy. I recall a question that Senator Lieberman posed to me in that hearing two years ago about my approach to that report, "Unfinished Business," and I said then and would continue to argue that I do not see it as our function, necessarily, to try to insist that in every case the priorities as understood by the experts, by the scientists, control. Obviously, it's the country, the people, their sense of concerns and priorities, and all the various judgments that enter into those that will finally determine what in fact our policy priorities are and how much budget resources we allocate.

I do believe, however, that where public perceptions differ significantly with expert opinion, it is our job at a minimum to inform those perceptions and to try to make sure that when the Congress makes choices at odds with expert opinions or with agency judgments, those are choices that are informed and consciously made.

I asked EPA's Science Advisory Board, very shortly after taking over as EPA Administrator, to review "Unfinished Business" in light of the most recent scientific and technical information. I also asked the SAB to evaluate different health and ecological risks, analyze options for reducing risk, and to develop a long-term strategy for better assessing and reducing environmental risk. Last September the SAB produced "Reducing Risk: Setting Priorities and Strategies for Environmental Protection."

As I requested, the report critiqued the findings of "Unfinished Business" and presented new ideas on how to rank risk. But the SAB went further. Based on their scientific understanding of environmental risk and our current programs for reducing them, the SAB recommended a fundamental shift in national policy.

I am deeply grateful to the Science Advisory Board for their thoughtful and thought-provoking report. In particular I want to thank Dr. Ray Loehr and Mr. Jonathan Lash for their leadership as co-chairs of the SAB committee that produced the report. They and their colleagues have tried to answer questions that are fraught with scientific uncertainty and political contentiousness. They presented a series of recommendations that merit serious discussion by everyone interested in environmental quality and how we protect it.

I invited a national discussion of the Science Advisory Board's recommendations in a speech at the National Press Club last September, and since then I have talked about the report and its implications for national policy in virtually every speech I've given, so I am very pleased that the United States Senate is joining the discussion in a formal way today and that, as the comments and statements of so many of you here have made clear, you have become very familiar and literate with the concepts and recommendations in the report.

So to begin I would like to ask Dr. Ray Loehr, chairman of EPA's Science Advisory Board, to share with you the insights that have been presented so thoughtfully in this landmark report.

Senator MOYNIHAN. Professor Loehr, we welcome you to the committee. As Mr. Reilly has said, you were the cochairman, with Dr. Lash, who is the Secretary of Natural Resources for the State of Vermont, of the Science Advisory Board. I am happy to note that you were once a member of the faculty at Cornell, but you are now with the Civil Engineering Department of the University of Texas at Austin. We are very happy to have you here this morning, sir.

STATEMENT OF DR. RAYMOND C. LOEHR, UNIVERSITY OF TEXAS; CHAIR, EPA SCIENCE ADVISORY BOARD; AND COCHAIR, RELATIVE RISK REDUCTION STRATEGIES COMMITTEE

Dr. LOEHR. Thank you, Senator.

Thank you, Bill.

Senator MOYNIHAN. You have a statement, which will be included in the record. You may proceed as you wish.

Dr. LOEHR. Thank you. My intent is not to read or get into the details of that written statement, which is available, but to try to summarize some of the key points in that particular document.

First, a little background so you can know my experience. As you point out, Senator, for the last six years I've been at the University of Texas teaching and doing research in the environmental area, and for 18 years prior to that I was at Cornell University, involved in many industrial waste and hazardous waste research activities at that institution. In 1983 I was elected to the Academy of Engineering.

In addition to a wide range of professional activities, as you note, I do serve as the chair of EPA's Science Advisory Board, a role that

I have had since 1988. My activities on the Board go back to 1980, when I first joined the board as a member of the Environmental Engineering Committee. Over the years I have participated in many fairly detailed SAB activities. The activity that we are talking about today is one of the larger and, I would point out, one of the more interesting ones because it gets into new areas and new thinking.

A point about the EPA Science Advisory Board that might be relevant is that it was established by Congress to provide independent and objective advice to the EPA Administrator on the technical and scientific bases for the Agency's rules and regulations. There are over 60 members of the Board, supported by about 200 consultants. These highly-qualified independent individuals are involved in eight permanent committees, about 50 or 60 meetings a year and about 30 reports per year. Thus, this is not the only activity of the Board; it has very broad responsibilities.

In general, however, the Board restricts its inquiries to the strictly technical and scientific issues surrounding environmental questions. In some instances, however, the Board is invited to examine broader issues and to render its technical and scientific expertise.

The "Reducing Risk" report that the Senators have read and referred to is one of the reports that are broader than the normal activities. I would note and bring to the attention of all in the audience that there are three appendices associated with the report that contain many detailed items of information that back up the eight findings and ten recommendations.

I would like to touch upon a few key points if I may. It is pleasing to see that many of the Senators have remarked on these points in their presentations.

The first point is that it is clear that the Nation has made much progress in controlling environmental problems. It is equally clear that we have not solved all the problems, and even with some of the ones we have begun to "clean up," there are some nagging long-term stubborn portions of those problems. As we note, we face newer environmental problems continually.

The second point is that we are going to have those problems around, and we need a greater array of options to solve these remaining and emerging problems. The conventional command and control approaches and the regulations of "thou shalt" type have been successful in the past. They will be used in the future, but there is a broader array of approaches that also will be needed. This array of options, including continued enforcement, should be used, and EPA and the Nation need to work smarter in this regard.

Let me make a point here about the report. This report, as I noted, is a report from the Board to the Administrator, requested by Mr. Reilly. We were pleased to be able to handle that request. But as we developed the report and as we looked at some of the issues, it became very clear that these are issues for the Nation. You will see in the report, and I will remark, that frequently these points are for EPA and the Nation to begin to address. Hence, this hearing is very welcome and I look forward to continuing activities from the Committee along this line.

The third point is that it is true that the public faces a wide variety of environmental risks. It is equally true that not all risks are of equal magnitude or impact. The report that the concept of relative risk offers an opportunity to determine which environmental problems are more serious. If we recognize—it is a big "if"—if the relative magnitude of environmental problems can be assessed, their magnitude and impact can be better understood. This provides a legitimate basis for evaluating between the competing interests that the Senators have identified.

In addition, the risk reduction options can be evaluated from a more common basis. This kind of a comparison becomes increasingly valuable as the number and seriousness of environmental problems compete for attention and resources.

The fourth point is that if there is to be an evaluation and a ranking, there needs to be criteria by which we do this. In the report a number of criteria were identified. Let me touch on three.

One is the question of time and space. Some problems take a long time to manifest their effect and, equally so, may take a long time to recover from that manifestation, and a long time for the public and the environment to recover from those impacts. That particular point needs to be better understood. Some problems also affect many individuals or ecosystems, and some are more local—

Senator MOYNIHAN. Is that your sense in which you use the term "space"?

Dr. LOEHR. Space, in terms of geographical space, global space, in terms of that kind of a spare vis-a-vis a local problem that might be very important to a local community and, as Senator Durenberger identified, to those who might have to use the ground water. But in terms of relative risks, the time, the spatial dimension, is important.

So we are suggesting that in addition to the current concerns, the future efforts should look beyond short-term, local issues.

The second point in terms of criteria is that the number of individuals and organisms exposed need to be considered as a key factor in the criteria. This is not to say that one individual is not important. It is to say that in terms of relative risk comparisons it is important to understand the numbers that are affected and the exposure that occurs.

The third point is the severity of an effect. A death is very important. The loss of an ecosystem is very important.

Now, these are criteria that this committee has identified as good, solid suggestions, and it is those criteria that were used to identify relative high priorities as seen by this group of individuals. Whether or not they are the most important criteria is something to be considered for discussion, but the point is that there needs to be criteria for these kinds of discussions and improved understandings of relative risks.

In terms of the decisions that are made from that, it's very clear that public policy decisions about environmental risk need public participation and the application of democratic principles. But that participation and discussion should have access to the best possible science and information for those judgments and for that discussion. It is that point which we hope comes strongly out of the report.

The fifth of the major points is that pollution prevention should be the preferred risk reduction option for environmental risk reduction whenever possible. This repeats a recommendation in a previous Science Advisory Board report and adds to other calls for creative action in this direction.

Senator MOYNIHAN. Dr. Loehr, there is a symmetry between that proposal and what we've learned about health over three millennia of dealing with it, that in the end preventive health measure are far more effective than reactive medicine, as it first appears. It took a long time to learn that, and I'm not sure we've even fully learned it yet. But that would be a model of what you're proposing?

Dr. LOEHR. The analogy is an excellent one. I might comment personally on that analogy. For the many years that I've been teaching environmental engineering courses, I have been teaching one on industrial waste management. In the first lecture we always talk about source separation, pollution prevention, avoidance of the contaminants before they get into the waste stream, and that imbues the discussion throughout the class. The students then go out and find that the emphasis is on the end-of-pipe controls because the regulations force the actions along those lines.

I am happy to report, however, that our current students going out are finding, within industry and within the public, a greater understanding of pollution prevention concepts, and perhaps the analogy that you use in terms of preventive medicine is finally coming home stronger and stronger. But it is a message that needs to be continued, and it is a point that is imbued throughout this report.

The last point that I would make here in terms of the points within the report, to leave time for questions, is the one that was brought up by a number of the Senators, that EPA and the Nation should attach as much importance to reducing ecological risk as it does to reducing human health risk, that is the duality that we are to protect both human health and the environment. We have done better, perhaps, in protecting human health over the years. It is time to recognize the fact that ecological health is important and that there is an interaction between human health, sustainable long-term economic health, and development.

The report and its detailed appendices are rich in details and findings and recommendations. We recognize that this report is another step on a long road toward a better understanding of environmental risks and their control. We hope that the report will stimulate much discussion about the important questions of, what are the major environmental problems that exist and will continue to exist? And how should they best be controlled?

In closing let me add a personal comment or two. It may be presumptuous, but speaking as an individual, there is an important role that Congress and this Committee can have in this discussion, which we hope will continue. This includes encouraging and participating in a national dialogue on the concept of relative risk and the options for reducing those risks. This includes encouraging a forum in which priority- setting of environmental risks can be debated. This includes encouraging and providing resources to agencies such as EPA to explore approaches to identify relative risks, to obtain data and information to reduce the uncertainty associated

with risk assessments, and to identify alternative options for their control.

I appreciate the opportunity to participate. As time permits, I would be happy to be involved in answering any questions that the Committee might have.

Senator MOYNIHAN. Thank you very much, sir.

Now, by previous arrangement, we go back to Mr. Reilly, who has a chart for us.

Mr. REILLY. I do indeed, Mr. Chairman.

[The chart referred to follows:]

RELATIVE RANKINGS OF SAMPLE ENVIRONMENTAL PROBLEMS

Problem	Experts	Public
Stratospheric Ozone Depletion	Ecology & Welfare - H Human Health - M/H	H
Global Warming	Ecology & Welfare - H	M/L
Outdoor (Ambient) Air Pollution	Human Health - H Ecology & Welfare - M	M/H
Indoor Air Pollution (Including Radon)	Human Health - H	L
Worker Exposure to Chemicals	Human Health - H	H
Hazardous Waste	Ecology & Welfare - M/L Human Health - M/L	H
Industrial Accidents Releasing Pollution	Human Health - M/L	H
Accidental Oil Spills	Ecology & Welfare - L	H

H= Relatively High, M = Relatively Medium, L = Relatively Low
Sources: Science Advisory Board and EPA staff; Roper Organization

Mr. REILLY. I would like to make two points before we proceed to questions, if I might.

One is to draw your attention to the relative rankings of sample environmental problems that I think very clearly makes the point, that the public and experts see the environment quite differently. On the left column is the statement of the problem; in the center is the ranking given it by the experts; and on the right column is the public opinion as reflected in a recent Roper Organization poll of attitudes toward these issues. And at the top of the list on the left you see "Stratospheric Ozone Depletion"—

Senator MOYNIHAN. And your rankings are H for relatively high, M for relatively medium, and L for relatively low?

Mr. REILLY. That is correct.

You see that for ecological and welfare concerns, the panel of the Science Advisory Board that dealt with ecology rated ozone depletion high. The human health group gave it a medium-to-high rating; the public agrees, this is a big one. They give it a high.

Global warming: ecology and welfare rated it high, and the public sees it as medium-to-low.

Outdoor ambient air pollution: the human health group rated it high; the ecology and welfare group rated it medium; the public rates it medium-high.

Indoor air pollution, including radon: I think this is a particularly interesting one. The human health group gives it a very high rating; the public gives it a low rating, believing they are relatively safe in their own homes, not giving to radon or some of the other causes of indoor air pollution the kind of priority and concern that scientists suggest they should have.

Worker exposure to chemicals: the human health committee rated it high, and the public believes it is high.

Hazardous waste: the ecology and welfare group rated it medium-low, as did the human health group, and the public sees this as right at the top of the list, as a high.

Senator MOYNIHAN. And again—that's the second disparity you find in the rankings?

Mr. REILLY. That's correct. That's a major disparity.

Industrial accidents, releasing pollution: the human health committee rates that medium to low; the public rates it high.

Accidental oil spills: the ecology and welfare group, looking at the immediacy of impact and the space-time considerations that Dr. Loehr described, rates it low; the public ranks it high.

I think these are very illuminating in terms of drawing out, as Senator Durenberger suggested, the counterintuitive nature of this report. They are not, I would like to say at the outset, a basis for reconsidering the statutes that I administer. They certainly do not represent an effort to diminish the attention or concern reflected in our administration and implementation of those laws. We have given a very vigorous and aggressive priority to Superfund, for example. We will continue to do so. In fact, over the last two budget cycles we have requested almost half a billion dollars more than the Congress in fact appropriated for Superfund cleanup. That reflects our commitment to implementation of these responsibilities.

Nevertheless, I think as we consider the relative deployment of energies and priorities within the agency, as we look at ways to im-

plement our existing responsibilities more cost-effectively with regard to ensuring that we get commensurate benefits for outlays, as we look at some of the more neglected or less attended-to concerns that experts point us to on this list, we should all take this information, I think, to heart.

Let me say that one of the phrases that most struck me in the Science Advisory Board's report is the following: "For the past 20 years, EPA has been basically a "reactive" agency. As environmental problems were identified, the public conveyed its concern to Congress and Congress passed laws to try to solve the problems within some, often well-defined, time frame. EPA then implemented the laws, using the resources, budget, and staff allocated by Congress.

Because most of EPA's program offices have been responsible for implementing specific laws, they have tended to view environmental problems separately; each program office has been concerned primarily with those problems which it has been mandated to remediate, and questions of relative seriousness or urgency generally have remained unasked. Consequently, at EPA there has been little correlation between the relative resources dedicated to different environmental problems and the relative risks posed by those problems.

I would just say in reaction to this statement that we have, I think, endeavored to be far more of a proactive agency. The question with regard to our having a seat at the table, I think, is answered by our very intimate and activist role with respect to a number of important matters identified as priority concerns by the Science Advisory Board. We have played a key role in the bringing on and the making of a decision to propose a framework convention on climate change. We had a very large role in the establishment of the Budapest Center to help clean up Eastern Europe. We've worked very hard to move toward full implementation, full phase-out of chlorofluorocarbons and to negotiate with other countries to get them to agree to that last summer in London.

We were intimately involved with the proposal that the President made at the G-7 summit last year for a worldwide forestry convention or agreement to address some of the species extinction problems and habitat destruction concerns that were given a high ranking by the SAB. We have been involved in the Enterprise for the Americas agreement and the Debt for Nature proposals that have been made there, to renegotiate public debt and to apply some of the interest on the renegotiated debt—a significant amount of money—to Latin American conservation and environmental protection.

We worked very closely with Secretary Yeutter on the 1990 Farm Bill and the environmental and conservation provisions of that bill. The President's tree-planting program to plant a billion trees a year, the elephant ivory ban, the involvement in the General Agreement on Tariffs and Trade, on phytosanitary chemical regulation issues and pesticides— we've been very closely involved, welcomed into those councils on each of those issues, and in the strategic planning efforts that we have under way and in our concern for cross-media enforcement, to development of an agency-wide lead strategy, for a new pollution prevention strategy that we

will announce next week, for a new program on Green Lights which now has agreement with 27 major companies to try to reduce very substantially the amount of energy they use for their lighting without any loss of productivity or quality of their lighting. In all of those efforts I think we are blazing some new trails. We're trying to take this kind of information very seriously and give to the concerns raised here the priority that the Science Advisory Board after long deliberation, believes they deserve.

With that I would ask, if I didn't, that my prepared statement might be included in the record.

Senator MOYNIHAN. It most certainly is.

Mr. REILLY. I would be pleased to answer any questions you may have.

Senator MOYNIHAN. Well, we thank you.

I think the first question should come from our distinguished ranking member who was, not long ago, down in the Brazilian rain forest in the best Marine tradition, pushing Jeeps out of the mud.

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator CHAFEE. Thank you, Mr. Chairman.

First, I apologize for being sort of in-and-out, but I do want to join the others in welcoming Senator Bob Smith here to the committee. I know he will make a very valuable contribution. It is nice to have a continuation of representation of New Hampshire on the committee. So, we are very, very glad that you are here. I know others have said that, but I would like to join them.

I have a statement that I will submit for the record.

[Senator Chafee's statement follows:]

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Mr. Chairman, we are here today to review a report of the Science Advisory Board entitled "Reducing Risk: Setting Priorities and Strategies for Environmental Protection." The report, requested by EPA Administrator Reilly, makes important recommendations concerning how EPA, and indeed, other policymakers, can address environmental problems in a coherent and strategic manner.

Mr. Chairman, I am particularly pleased to welcome Administrator Reilly to this hearing today. During his first 2 years at EPA, he has been a leader in aggressively administering our environmental laws. Once again, he is demonstrating his leadership today by bringing forth a report that urges all of us to change the way we think about environmental problems.

I would also like to welcome Mr. Raymond Loehr, Chairman of the Science Advisory Board and cochair of the committee that produced the report. I commend Mr. Loehr and other members of the committee for their hard work and useful recommendations.

Mr. Chairman, the SAB report makes a number of findings and recommendations worthy of the serious consideration of both EPA and this Committee. Taken together, the report's recommendations indicate that we should keep our eye on the "big picture" of environmental policy, and direct the bulk of our energies towards those problems that pose the greatest risks because they take a long time to solve and affect large numbers.

It is clear that some of these recommendations will generate some controversy and may be difficult to implement fully. However, even if every goal stated in the report cannot be realized, many of the individual recommendations taken alone should be implemented. As we all know, some of these recommendations are not new, but should not have greater force because they have been put forward by an independent and diverse group of scientists.

Several of the recommendations are of particular interest to me. For example, recommendation no. 7 indicates that "EPA should emphasize pollution prevention as the preferred option for reducing risk." I stongly support this recommendation. The practice of pollution prevention, or waste minimization, as it is sometimes called, must be ingrained into our thinking in order to change the way we approach environmental problems. It not only can save companies substantial sums of money, but it also can significantly reduce stresses on our environment.

Both Congress and the Environmental Protection Agency have already begun to address this issue in a serious way. EPA has developed a pollution prevention strategy and is in the process of developing an implementation plan.

In addition, last year, Congress approved pollution prevention legislation. This new law, The Pollution Prevention Act of 1990, establishes a national policy to reduce or eliminate the generation of wastes at the source wherever feasible, and directs EPA to undertake a multi-media program of information collection, technology transfer and financial assistance to States.

The law is designed as a first step toward maximizing voluntary reductions of hazardous waste and other pollutants created during the manufacturing processes. Under this new act, companies will be required to report on the quantities of pollutants entering the environment, and also on the reductions achieved as a result of implementing pollution prevention measures.

Recommendation no. 5 states that "EPA should reflect risk-based priorities in its budget process." In my view, EPA should begin to integrate this kind of analysis into its budgeting process as soon as possible. Hopefully, incorporating those priorities into a budget document will communicate to Congress a strong overall vision of environmental policy when that budget document is received on Capitol Hill. While that vision may not always be shared, at least Members of Congress will have a useful blueprint from which to work.

In recommendation no. 3, the Science Advisory Board rightly points out the great need for additional data to assess, compare and reduce environmental risks. Congress, and this Committee in particular, recognizes gaps in data in many areas every day. I hope to hear the views of Administrator Reilly on how this problem can be solved, and how Congress can assist in finding a solution.

Finally, the recommendation that I find most interesting and challenging is no. 9, which states that "EPA should work to improve public understanding of environmental risks and train a workforce to help reduce them." The SAB Report found, as we in the Congress often have, that the public perception and the scientific understanding of environmental risk do not match up to any great degree. As a result, Congress and EPA may at times find themselves devoting large amounts of resources to problems that do not pose the most significant risks. This is a difficult problem, with no readily apparent solutions. I look forward to any ideas that either of the witnesses may have to address it.

Recommendation no. 9 also states that the Nation's scientific capability must be greatly enhanced. I wholeheartedly agree. Members of Congress and EPA should put their collective heads together to encourage the youth of this country to enter this vital field.

Mr. Administrator and Mr. Loehr, once again, I thank you for bringing this report to our attention and I look forward to hearing your comments on it. In addition, I thank the Chairman for convening this hearing to review the report.

Thank you, Mr. Chairman.

Senator CHAFEE. First I would like to say to our witnesses that as I looked over this relative ranking of sample environmental problems, I think we can look at it with some encouragement in that whether by design or action, nonetheless we have addressed each of these items with considerable energy, both through the EPA and through this committee. Just looking at stratospheric ozone depletion, it is ranked high by all groups, and certainly we went all out for that in the clean air bill that we just passed. On global warming I don't think we've done as well, and so forth on down through the list.

It is interesting that on some of these—take indoor air pollution, which is ranked so high, and low by the public, and yet great efforts are made. In my State we have a statewide director of health. We don't have local health departments; we just have one state-

wide health department, and a great effort has been made to test for radon. I don't think it has had much result. The question is, how do you do it? I don't think we can have Government individuals testing every house without getting permission or without being asked. We have these canisters we distribute, and it just hasn't received much response.

But my question to you, Mr. Reilly, is whether there are any items that you don't support in the Science Advisory Board report.

Mr. REILLY. Broadly speaking I think the report as a whole is really a vital contribution. I think that each of the recommendations deserves to be taken very seriously. I do not myself have the sense that we need a change in structure of Government organization to ensure more orderly consideration of interagency problems than we now have. I think the existence of groups like the Council on Environmental Quality, the Domestic Policy Council, the Economic Policy Review Group function quite successfully, as do some of the other committees—the Technology Group that is overseen by the Science Advisor to the President—to ensure that interagency considerations do get heard, and that what one agency does meshes reasonably well with another.

I think that is a relatively minor criticism. I am highly sympathetic to many of the other proposals in here, and very much want to see responses that we are giving them within the agency. We are going to devote our next strategic planning meeting next month of the leadership of our agency, the management leaders in the agency, to considering strategic risk and this report. So I may at that time develop other specific reactions that I don't have right now.

Senator CHAFEE. First, I want to join in the general thanks to Dr. Loehr for the work you've put into this. It has been a big undertaking and we appreciate it.

The next question, if it falls within my time, is to follow up on your statement, Mr. Reilly, about what you do next, how you implement the strategy. I take it this comes out of your strategic meeting of your top people.

Mr. REILLY. We will give a major amount of time at that meeting to strategic planning. We have asked that in the preparation of the four-year strategic plan, which is now well under way for each of the programs of the agency, that strategic risk—comparative risk—be the basis for setting out priorities, and that it inform the choices that are made, within the constraints, obviously, set by our legal obligations and the statutory requirements.

We have also asked each of our regions, and they in turn have begun to work with several States—there are about half a dozen States for which comparative risk analyses are now being prepared. So this is increasingly permeating the planning of the entire agency, and those planning documents will reflect it.

Senator MOYNIHAN. Senator Chafee, could I ask a supplement to your question?

Senator CHAFEE. Sure.

Senator MOYNIHAN. It's precisely to the point that Senator Chafee asked.

Last August in Science, which is the Journal of the American Association for the Advancement of Science, Mr. Beardsley, Deputy

Assistant Administrator for the Office of Policy, Planning and Evaluation, said that, speaking of your budget, 80 percent was "cast in stone" by statute, and that the Congress had in effect directed you how to use another 15 percent, which leaves you 5 percent on which you have some discretion.

If that is the case—and obviously it must be, or Mr. Beardsley wouldn't have said it—how do you respond to Senator Chafee's question, that if the legislative priorities that we have given you are not the priorities that relative risk assessment would indicate, what next?

Mr. REILLY. Well, I think there are a number of ways of looking at this problem. We have a $6 billion budget. A substantial amount of that is accounted for by the construction grants program for wastewater treatment and the Superfund program, the trust fund programs generally. The agency itself is giving a very high priority, and I think having quite a lot of impact, in a number of areas that are not in and of themselves particularly expensive, either in terms of our budget resources or, in some cases, in terms of private sector costs. The ozone depletion effort is a good example of that, I think. We have had an impact totally disproportionate to the relatively small size of the budget that is allocated within the air program for that.

I think you also have to look at the effort made by the broader society which—again, in an analysis which we have just about completed which you will get next week on the costs of a clean environment—it indicates that we are spending over $100 billion a year on environmental cleanup issues in the United States currently. That number will increase by some 85 percent, I think, almost doubling in the next 10 years. The major outlays there happen to be clean air compliance and hazardous waste cleanup, and also Federal facilities cleanup.

So that's a better way to look at the degree to which the agency and society together—given that the agency is the cockpit of environmental priority setting, but the resources deployed by others are much greater than ours—looked at that. I think that particularly over the long-term future you do have some questions arise about the relative role of hazardous waste cleanup vis-a-vis some of the other problems on this list.

Senator CHAFEE. That's the only question I had. Thank you. Thank you both, gentlemen.

Senator MOYNIHAN. Senator Smith.

Senator CHAFEE. Mr. Chairman, I have some questions that Senators Jeffords and Durenberger would like answered, if they might.

Senator MOYNIHAN. The most assuredly will be included.

Senator CHAFEE. I believe they are all directed to Administrator Reilly.

[Responses to the questions referred to were not received in time for publication.]

Senator MOYNIHAN. Senator Smith.

Senator SMITH. Thank you, Mr. Chairman.

I found your statement and your testimony to be right to the point and very interesting and not, as sometimes is the case with testimony, a lot of—I don't want to use the term "bull," but why not?

[Laughter.]

Senator SMITH. This is right to the point. I think it's a great way to start the committee off this year to have this kind of an overview and this kind of honest approach to the whole situation.

I have just a couple of questions, Mr. Chairman.

It seems to me, as I look at the priority rankings that you have on the chart, that if you look at the rankings that are ranked high by the public and not as high by you, they usually, at least in the examples you gave, are directly related to legislation that the Congress has passed. For example, Superfund—it's almost like a self-serving prophecy. If Congress reacts to the public with legislation, then the public is going to continue to focus on it because we're expending monies to clean something up.

But I certainly understand your point, where the scientific community has identified things that are of greater importance. How do you deal with that? As I look at some of the things that you have ranked very high up there, and I think of— what's the population of the world, Mr. Chairman, 7 billion or 8 billion people?

Senator MOYNIHAN. I think it's more than that.

Senator SMITH. The population of the world compared to the 250 million or 260 million in the United States, you think of people out there in third world countries who are trying to find something to eat just to stay alive and trying to find shelter, it's just not their agenda. I don't know how you can get up in the morning and have the enthusiasm to continue, and I commend you for it, because it's like swimming upstream.

I know there is a great effort on the part of many countries of the world. I was on the committee in the House that dealt with these same issues, so I have been looking at them for the past six years. But I am absolutely amazed by the enthusiasm that you folks have for this, but how in the world do we ever get to these big problems, stratospheric ozone and global warming, which are the kinds of things that are going to take us out as a planet—those are going to do it—and yet we don't have the sophistication in most countries of the world? And that's not meant to demean other countries. There are many countries that in many cases are doing as much as or more than we are. But when you look at where the population is spread out, particularly in the third world, just existing and surviving the day is the number one priority, let alone the year. How in the world do we get at these problems in a global way?

Mr. REILLY. One of the things that I think is increasingly clear to leaders of developing countries is the precariousness of some of the life support systems that are in their ecologies, in their natural systems, and the degree of anxiety about allowing systems to become further impaired. And in some cases, just straightforward political concern, where air pollution has become a major issue to the broad mass of people who live in cities like Mexico City and Santiago and Caracas and Sao Paulo and others.

The Eastern European lesson, I think, has been learned by a good many people in the developing world as well. The countries that chose to forego environmental protection in order to stimulate economic growth and development, in fact, saw both their economies and environments wrecked.

The kinds of questions I sometimes have are, what, as we look back, will we find really made a difference and will we be remembered for? One of those, clearly, is the degree to which we help other countries now, who see us as having led on the environment for so long by making available to them resources, information, reports like this, technical experts. We are doing that consistently all across the world today in EPA, and doing it for a relatively small amount of money. In fact, it is typically not even an appropriated amount when we do, borrowing from one program or another according to a problem that we have.

The Prime Minister of Lithuania or of Latvia said two months ago, after we had sent a mission to deal with a chemical contamination of a drinking water supply that occurred in the Soviet Union, that our mission had more impact than any foreigners since Lindbergh. He was so grateful for the kinds of expertise and help that we brought.

The recommendation here that we give to ecology, a co-equal priority to health, I think is a particularly important one, particularly when you look at the rest of the world and their needs and problems. The possibility of disturbing the climate system, of interfering with our system of ozone protection, of losing some of the major forest systems that remain in the world, with all of the impacts that that will have, I think those have got to be much higher on our priority list than they have been. We are trying to give that priority and, I think, increasingly finding that that is welcomed by the rest of the world, particularly in some cases by those who have severe economic problems.

Senator SMITH. I know you are, and I commend you for it. Everyone knows the example of the rain forests. People are knocking down rain forests for economic gain—to heat, to eat, to raise livestock in place of the trees. In a world sense it's just such a difficult task.

Here in the Congress we get bogged down—and I don't mean to demean these things, because they're all very important—but we get bogged down in hearings that, frankly, are very compartmentalized and very parochial, Save the Whale, Save the Elephant. If you look at the whole biodiversity issue itself, I think sometimes we are focusing on one little branch when we ought to be focusing on the whole tree, to use an appropriate analogy, I suppose. It is related. How many things do we destroy by trying to save the elephant, for example, in the whole ecological system?

It just seems to me that if it's not done as a world-wide effort pretty soon, it may be too late. It may already be too late.

Mr. REILLY. I think you point to the need to do things, whether it's elephant conservation or forestry protection, in ways that reinforce the economic goals and objectives and needs that people have. In some of the most successful cases, conservation has in fact done that. That's been true in Zimbabwe, where they have found that ensuring that the kinds of funds paid by visitors—safaris, photographic safaris, things of that sort—get to the local people, has resulted in local people working very hard to stop poaching of elephants. There are forestry experiments that have worked similarly.

One of the recommendations in this report is that we rely increasingly on economic incentives and market incentives, as in fact

you did in the Clean Air Act with respect to both air toxics and the acid rain title. We are going to get more cost-effective results when we do that. We are going to send signals that are understood and have impact, and help to put together our economic goals, to reconcile them with our environmental objectives. I think that's the wave of the future. That's the essence of pollution prevention, as well, in the companies where it has been practiced and found to be profitable.

Senator SMITH. Mr. Chairman, I don't want to take too much time.

Senator MOYNIHAN. Take all the time you want. It's your maiden questioning.

Senator SMITH. I would be very interested, as the rest of the committee would, I'm sure, in any specific recommendations that you might have for reprioritizing whatever legislative priorities we've had in terms of—your "dream sheet," if you will, where you could come in and say, "These are the legislative priorities that you've given us that we think ought to be reprioritized, and here's how it ought to be done." I would certainly be very interested in seeing that.

Finally, I would just like to say that I was particularly struck by a comment that you made in your statement which I think goes right to the heart of the whole issue, "Neither the board nor I wants to get into every other agency's business; the other agencies need to be getting into our business, which is saving the environment." I think not only the other agencies of the Government, but the other countries of the world, the other peoples of the world. Both of you mentioned the extreme importance of education and the fact that getting a curriculum, making environmental study very much a part of the school curriculum in this country—I think that's a great idea. I think that's the way we've got to do it, not only in this country but in all countries of the world. How you do that in the other countries, I don't know. It's tough enough to do it in this one. To try to do it in all the other countries of the world would be difficult.

I just find this whole thing fascinating. It's a great start and I hope we can follow up with some specific recommendations along the line.

Did you just pull out samples? Or did you do a complete study and just isolate these for the chart?

Mr. REILLY. Well, the major problems on the left are somewhat selectively chosen, but most of the principal concerns raised by the Science Advisory Board are on that list on the left. There are some that are not, contamination of drinking water and one or two others that are not there.

Senator SMITH. Well, one that's not up there, and I know Senator Moynihan and Senator Chafee and I are all interested in it, is acid rain. I was just curious as to what the public perception is versus the expert opinion of that, if you have it at your fingertips. If not, you could provide it.

Mr. REILLY. Do you want to answer for the Science Advisory Board?

Dr. LOEHR. Not in terms of that particular issue, no.

Senator SMITH. Well, there's a lot of controversy. I get a little suspicious about the scientists because there are so many scientists who disagree on these issues. So when you say you've got a 60-member Science Advisory Board and they come up with a conclusion, you could probably go out and put another 60 members together and come up with another conclusion. It's very difficult for those of us who are not scientists, who are laymen, to try to draw any conclusions. That's the frustrating part for me.

I had an experience in my own home with radon; not a lot of radon, they tell me, not enough radon to worry about, but when you get these numbers, 0.34 percent this or that—I am not surprised, for example, that radon would be low in the public perception because what is the alternative? If I've got radon in my house and I have to sell it, who is going to buy it? So I don't want to admit I've got radon in my house. I'll just live there, and hopefully it's a bunch of malarkey and I'll be all right.

[Laughter.]

Senator SMITH. It's really very frustrating. Ozone depletion is something that's up there, out of my house. It's not in my house, so therefore I can say it's more serious.

I think we have a lot of problems here to try to focus on.

Mr. REILLY. You raised a number of fascinating questions. On the issue of whether a different panel of 60 or so experts could conclude differently, the point I would make is this. It strikes me that there is a pretty close coincidence between the views of the professionals that the Environmental Protection Agency consulted back in 1987, reflected in the "Unfinished Business" report, and those of the Science Advisory Board, reported in September. They are very close together in the priorities that they assigned to issues.

A second point that I would like to make, if I might, has to do with your request for a list of legislative priorities in response to this report.

I think it's really important that we give to the proposals that have been made here an airing and have a debate on them without regard for their immediate consequences for any legislative changes or priorities. I did not commission the report, and they didn't undertake this effort, with an eye toward completely reorienting the amounts of money we spend or the way we operate our programs. I think that if people see the effort in that light, they are likely to pay less attention to what could be, here, a very enduring contribution.

What we want to do, above all, is get as much rigor in our decision-making as I think we now have vigor. In the end we have very little alternative but to repair to good, sound science when we're trying to make decisions affecting the environment—

Senator SMITH. If I said legislative priorities, I didn't really mean legislative. I meant priorities, perhaps in terms of removing some. If I said legislative I misspoke. I didn't mean for you to come in with legislative priorities for us.

Dr. LOEHR. If I might add just a comment, Senator, to follow up on Bill's point, I think the report needs to be read — as you are reading it—as from a group of very capable and talented individuals who first attempted to lay forth basic principles and criteria, and then using them to suggest what they felt might be problems

of a higher priority, to stimulate discussion and dialogue. It is that dialogue that we hope will continue, rather than having this list or any other list that a group would come up with be the overall, only list to be looked at.

There is controversy, as you note. It is important to get continuing dialogue. It is equally important to get those principles and criteria reasonably well understood so that we have a common base from which discussion can continue.

Thank you.

Senator SMITH. Thank you.

Senator MOYNIHAN. Thank you. Could I just make a point in response to Senator Smith on some of the time dimensions?

These things come about more quickly than you would expect, environmental degradation of a large order. I was once our Ambassador to India. It wasn't that many years ago. At that time there were half a dozen people wandering around New Delhi saying, "If you don't do something about the deforestation of the Himalayas, up in Nepal, you're going to regret it, by golly, and sooner than you think." The population had just begun pressing people up the hillsides and cutting down the scrub up there—just scrub, cutting it down for firewood. Once it went, down came the monsoon, which would hit the Himalayas like a pane of glass, and down it came. Down came the soil. It just denuded it completely, and there are now new islands appearing in the Bay of Bengal, which was the topsoil of Nepal. It has just been devastating. This has happened in just 20 years. But other things, obviously, are restorative and take longer. Not everything that goes wrong can't be righted; some things don't get righted, however.

Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman. I apologize to you and to Mr. Reilly for the fact that I couldn't be here to hear your statement, but I've read it and I admire it.

Let me just pick up on a few questions. The report concludes that a major focus of our national policy should be to develop new energy sources, and that EPA should be involved in that particularly insofar as new energy sources would not damage the environment. I'm thinking of renewable, clean energy sources.

It also concludes that energy efficiency must be a major focus of national policy and that we need to promote energy conservation through institutional changes including, for instance, incentives for utilities to encourage conservation. Yet it seems to me that our Government—and a lot of others, obviously—our Government has lagged woefully behind in these pressing needs to promote energy conservation and renewable energy sources. I can tell you that, by coincidence, there are three companies in Connecticut that are doing some pioneering work on the development of fuel cell technology, and yet they have been forced to begin to work with Japanese companies to sustain them economically because the Japanese companies are given support by their government. Something that our Government is not giving.

I guess my question is this: could you respond to these sections on energy leadership and relate them to what I think is the failure of all of us to lead in this area thus far?

Mr. REILLY. There are a lot of exciting things happening in the country on energy conservation and energy efficiency improvements. I'm familiar with some of those efforts in Connecticut. Some of the utilities are encouraging their clients to install new, energy-efficient technologies as ways to obviate the need to construct new plants for which either fuels would be difficult and expensive to get, or sites virtually impossible to get agreement on in the near term.

The public utility in San Francisco recently announced a 3,300-megawatt capacity increase over the next 10 years, I believe it is, 2,500 megawatts of which they propose to acquire as a result of efficiency improvements by their service base. There are smart windows being developed which cause light to go one way and heat to go another and which can be switched on and off to perform the appropriate role in winter and summer.

We at EPA have a new program, Green Lights, which we've just mounted that involves our assessing the capability of a major company to reduce its expenditure and energy use for lighting by very substantial percentages. We ask the company to simply sit down with us, do the analysis, proceed to look at the technology and see if it's profitable, and not to do anything if it isn't. We've had 27 companies now, including some major ones—Browning-Ferris, Boeing, and a number of others—sign up to participate in this program. Lighting reductions can reduce dramatically the energy used, and all the attendant sulfur dioxides and carbon dioxides and oxides of nitrogen associated with that. I believe this is going to make a tremendous contribution, and it is "low-hanging fruit," in effect. These are opportunities that, for one reason or another, just haven't been understood and taken advantage of.

We are expecting very much to give support and encouragement to initiatives like this in the National Energy Strategy that had been intended for release sometime in December. The events in the Persian Gulf have caused some change in the schedule, but the President has been involved in several briefings on that strategy in front of most of the agencies concerned. We continue to give it high priority.

Senator LIEBERMAN. I appreciate your answer. I appreciate the examples you've given where EPA is encouraging these energy-sensitive steps, which are also environmentally sensitive. You are right, there is a lot of effort going on, a lot of it self-starting, including steps by the utilities to stress conservation.

But I think what we've lacked up until now is a bold national energy policy that suggests that there is some urgency about this problem, which I believe we all feel there is. I hope that your voice on the environmental consequences of no national energy policy will be reflected in the deliberations that lead to the national energy initiative.

Mr. REILLY. I appreciate that, and we will continue to look for opportunities to make our contribution.

To put it in perspective, if by our analysis the lighting changes that would make sense for major companies, commercial and industrial lighting, were taken advantage of in this country, we would reduce sulfur dioxide pollution by 7 percent. You can recall our efforts to calculate how we would reduce it by 50 percent over

a 10- or 15-year period. These reductions would come much faster and have a major impact on visibility and all the other pollution problems associated with sulfur dioxides.

I appreciate your point. There are so many reasons why this country ought to go in that direction in terms of environmental concerns and increasing our trade balance.

Senator LIEBERMAN. Incidentally, we could also start right at home with the Federal Government's energy bill. We spend billions ourselves every year just to light and heat Federal buildings, and I don't think we're doing enough to conserve there.

Let me move to one of the other points. The report seems to suggest that EPA has not given enough attention to what they describe as "natural ecological systems" by focusing instead on risks to human health. I, myself, you will not be surprised to hear, wonder whether this is a real distinction between the two forms of risk.

But I wanted to ask you if you could respond to that suggestion or conclusion in the report, and also to address yourself to the question of whether you feel you have sufficient statutory authority to address these ecological risks, or whether authority is currently scattered too widely in other governmental agencies, such as NOAA or the Department of the Interior, for EPA to play the leading role that I believe it should.

Mr. REILLY. Well, in the late 1970's I think the emphasis tended to be placed very heavily on the role of the Environmental Protection Agency and the principal statutes we administer in reducing threats to health. The agency was somewhat recast as a health protection agency in the minds of a great many people.

That had not been the concept, I think, of those who designed it in 1970. To some degree I think the focus on protection of natural systems and the ecology suffered by comparison. I welcome the recommendation of the Science Advisory Board that makes the point, as you did, that fundamentally these are closely connected, and that if your ecosystems are impaired, it is probably telling you that you have not developed a long-term sustainable relationship with nature, with your environment.

Now, the agency has made enormous contributions to ecological protection. A good example is the Great Lakes where, some 20 years ago, it looked doubtful that there would even be fish in Lake Erie and possibly others. Fish are plentiful today in those lakes. You can't eat an unlimited amount of some of those species, however. They still contain contaminants of one sort or another, PCBs, heavy metals, even DDT.

In my view, that is a measure of a job half done. We are going to have an initiative, a greater focus of all of our resources—wetlands restoration, nonpoint source control, which is an area where we don't have a large amount of authority; it is primarily a State and local government concern, but it is vitally important to control if we're to go the next step and complete the job that was begun in the water quality effort.

We will look and have looked for other opportunities, particularly to give a higher priority to wetlands protection and conservation. We've done that, and made some major decisions in the water quality program to try to sensitize the country and the regulated

community to the importance of highly productive wetlands for all sorts of purposes: flood plain protection and buffering pollutants and nurturing wildlife, serving as nurseries for fish. Those authorities we have used aggressively. We will continue to, and also begin to make more of the importance of ecosystem protection in our pesticide laws where we have actually acted to reduce the risk from chemicals to endangered species when we discovered that they, and not necessarily humans, were affected by chemicals.

So it is a recommendation that I welcome—not only in the United States but also, as appears from that list, as it affects other countries. When we've worked on the proposals for a forest convention or ozone depletion concerns, that is very much in my mind.

Senator LIEBERMAN. Mr. Chairman, do I have time for one more question?

Senator MOYNIHAN. You surely do.

If I could ask Mr. Reilly—it's about 11:30 and we will want to close at noon, but you can stay with us until noon, can't you?

Mr. REILLY. Yes, indeed.

Senator LIEBERMAN. I am glad to yield if you want to go to others and then come back.

Senator CHAFEE. I just have one question, if I may.

Senator MOYNIHAN. Please, Senator Chafee. Rank has its privileges around here.

Senator CHAFEE. Just one quick question. This isn't meant as a "zinger," but just to keep you on your toes.

You have identified indoor air pollution as having a significant effect on human health, and it cites radon and airborne combustion products, including passive tobacco smoke; yet the EPA has remained opposed to an indoor air bill which was offered by Senators Mitchell, Lautenberg, and myself and which passed the Senate last year. Do you believe you can support that legislation this year?

Mr. REILLY. We have, in the past couple of years, increased our indoor air pollution budget by almost eightfold. We have had major efforts to try to sensitize and inform the country about the risks from radon. There are some very controversial efforts to try to identify the threats. The Science Advisory Board played a key role in this and is now playing a key role in this, in assessing the health effects of secondary environmental tobacco smoke, these being the two major problems with indoor air.

So I think we've given a very high priority to that. We've also developed a draft set of guidelines for offices in construction with respect to environmental tobacco smoke and protection from it that I think will have a great influence.

We've given this a fairly high priority. We have not had the impression that the classification—the development— of particular standards for a whole set of indoor air pollutants, such as proposed in the legislation you mentioned, is the best way to do that, the best way to go at protecting us against some of these problems. But we will continue to want to relate to you and the committee on what further authorities, if any, we may need.

Senator CHAFEE. Okay, fine. Thank you very much.

Senator MOYNIHAN. I think he got out of that very nicely.

Senator CHAFEE. I thought it was very skillful.

[Laughter.]

Senator CHAFEE. I thought it was extremely well done.

I just want to say this. I think Administrator Reilly is doing an excellent job, and I thought the way he told us what his agency is doing in a whole series of areas around the world was impressive. We're proud of that agency. It's a big agency and we think you've done an excellent job. We're very glad you're there. Thank you.

Thank you, Mr. Chairman.

Thank you, Joe.

Mr. REILLY. You know, if we are going to take a little more time, Senator Chafee, you raised the radon issue before. I think all of us would find it interesting—I certainly did — that in a recent radon briefing we looked at some of the health data that suggests that in the range of 22,000 people annually lose their lives because of radon concentrations in their homes, of whom some 3,000 are non-smokers or people who never smoked; 5,000 or so once smoked, and the rest are active smokers.

We, as you know, do not have regulatory authority, nor do we seek it, to enter people's homes to deal with this issue. But the question that arises, and it raises a whole range of them for science and public policy and our roles and responsibility, is this: the way we have tried to affect behavior—public education, public service, television announcements, and so forth—suggested a very serious problem and concern. We've done that because we've studied very carefully the effect of efforts to cause people to use seat belts or to temper their smoking. That has raised some concerns in the scientific community, that perhaps we have overstated the risk or unduly alarmed people, and the relationship between science and public policy, what we know as a matter of science on one hand, and what it takes to get people to change behavior on the other is quite important here and is posed very closely by that experience.

It is a particularly interesting one, I think, because it is an example of where the agency is trying to lead without having a regulatory program, without having the traditional command and control tools at its disposal, which would probably not be very effective in any event, but where it confronts some of these concerns about scientific integrity, public education, and possibly contributing to undue alarms.

Senator MOYNIHAN. Thank you.

There is that elemental fact, "life is a bitch, and then you die."

[Laughter.]

Mr. REILLY. You always state these issues more succinctly than any of the rest of us. There's no risk avoidance there.

Senator MOYNIHAN. Senator Lieberman.

Senator LIEBERMAN. I was going to ask a question about evaluating risk, but it's hard to do after that.

[Laughter.]

Senator Lieberman. But I will proceed nonetheless, understanding the end point of all of our deliberations now.

I thank you, Mr. Chairman.

I wanted to discuss with you the whole question of evaluating risk, because I think that risk is quite properly the standard that you are suggesting that we hold our actions and EPA's actions to, what are the risks and how are we protecting people from them, and which are the most important.

It seems to me that one of the criticisms that might be leveled at such an approach is that you have to have a methodology to evaluate the risk. That methodology may be subject to manipulation by policymakers based on their ideology. What I have in mind particularly is the regulatory agenda that OMB put out a while back in which I think they pretty frontally went at the risk assessment methodology that EPA currently employs, suggesting that it is too conservative. I use the term conservative to mean that you're being overly cautious, or conservative in protecting the public from risk.

I think you have answered those allegations pretty effectively, and I know that others have come to your aid, some suggesting that, in fact, you are not conservative enough because in certain cases you're only protecting from cancer and not concerned, for instance, about damage to reproductive systems or neurological damage from certain environmental threats.

My question is, does the recent criticism—some might call it an attack—from OMB justify some of those concerns that when we're talking about risk assessment, this is not really science but ultimately just another expression of ideology?

Mr. REILLY. I think the agency has gone as far as others, probably farther, in this country and virtually all the rest of the world in trying to develop systems and methods of risk assessment, and then of risk management, and has done it with respect to virtually all of its major programs. I think we need not be at all defensive or apologetic about that effort.

We have developed our various risk assessment assumptions and exposure assumptions and the like—it should be no surprise—in the context of dealing with each programmatic responsibility and threat that we have. You can criticize the effort, I think, for a failure to do as systematic and as consistent a job across the whole spectrum of agency responsibilities as we might have. We do not, within the agency, have common approaches to risk assessment in areas where we might, and we are currently working to get them. We have a risk assessment council within EPA that is addressing those very questions about how to determine exposure and maximum individual risk and exposure and things of that sort.

There is also an effort underway that we are leading, and Deputy Administrator Hank Habicht chairs for the "FCCSET Committee," the Federal Coordinating Council on Science, Engineering and Technology, to look across the Government as a whole and ask the same kinds of questions as we've been asking within EPA: if you're not going to use the same kinds of methods, why do you not use them?

I find it very difficult to explain to people why it is, for example, that the Environmental Protection Agency has a substantially different characterization of the cancer potency of dioxin than the Food and Drug Administration, for example. Well, we're working closely with FDA to try to, first, understand the assumptions and techniques that have led up to this very different result, this order of magnitude difference, and then to see—not necessarily who is wrong, because the Science Advisory Board when I asked them that question, said that both methods are defensible and there is no basis for changing either one—but rather to see if there is some way that the two agencies can come together, because I think the

end result in terms of public perception and understanding is very difficult to live with.

So we're working on this effort. It is a fundamentally important one. These are not trivial or easy issues to address. I think we're going about it in a pretty systematic and professional way, and I'm quite proud of EPA's priority for risk assessment.

Senator MOYNIHAN. If Senator Lieberman would allow me, I would just cite this dioxin assessment difference as an example of the frequent experience, that as you begin to try to apply a scientific method and methodology to—you named the issue, but in this case, contaminants—the initial experience is to raise doubts and confusion in an area where there was once serene certainty. Science is not a process of proceeding from question to answer, period. It's a process of proceeding from question to yet another question. Most of it is probabilities in the end, with very few certainties.

That is what takes an informed public and an informed Congress to say that when scientists disagree, that is the process by which knowledge advances.

We have a problem. There is no natural scientist in the Senate. There has only been one in our history—well, when Thomas Jefferson presided, we had another one—and we are not at ease with the complexities which are the everyday life of a mathematician and a scientist.

Dr. Loehr, isn't that about right?

Dr. LOEHR. That's well put, sir.

Senator LIEBERMAN. Thank you. That's a very important point, Mr. Chairman. I appreciate your making it at this point. I agree with you, that we're trying to infuse these deliberations with scientific values and methodologies; and yet, Mr. Chairman, as you rightly said, science is not a process of a question that is answered, it's a question that is answered and then raises another question.

My hope in point—and I know it's yours, and I admire the response that you've given OMB—is that in that process we try as best we can to make sure that the questions and answers are rooted as much as possible in science and not in politics, not in ideology. I thank you for your part in the defense of what I think is a sound approach that you're taking at EPA.

Mr. REILLY. And we will not only defend what we've done. I think an important part of the scientific conversation that we hope will continue to proceed here is a readiness to accept that, as new science comes in that suggests that we have either underreacted or overreacted, that we acknowledge that, go through the processes to develop a new position, and communicate that to the public. That's going to require, perhaps, a little more sensitivity to process and, I think, more understanding of some of the uncertainties involved than many people may like or be familiar with. A wise and thoughtful man once said, "Knowledge is sorrow," and there is a certain degree of tentativeness about the number of conclusions; and certainly in this report the scientists were at pains to say over and over again that in a number of areas the data was far short of conclusive. I particularly admired the fact that they did not become two-armed scientists in the sense that Harry Truman used to worry about two-armed economists—on the one hand, on the other hand. They nevertheless gave us their sense and their best

judgment, given the data that we have, of what the significant problems are. They have made us a lot more effective, I think, and given us something very important in the process.

Senator LIEBERMAN. I agree.

Thank you, Mr. Chairman.

Senator MOYNIHAN. If I could just pursue that, on your number one problem, stratospheric ozone depletion, and number two, global warming.

Let's take global warming, which the experts rate as very high. Aren't we in an area here where the degree of confidence in the scientific community is fairly low and there are quite different views on this? Mr. Reilly and I once talked about the Committee on the Challenges of Modern Society, which was set up in NATO 21 years ago as an American initiative, and I happened to be the person who was heading the delegation. I thought we could go over and talk in Brussels about global warming, so I set out to find out about this subject. I could literally walk down a corridor at the Massachusetts Institute of Technology and knock on every door, and the first door would tell you that the world was going to end in fire, and at the next door the professor would tell you that the world was going to end in ice. So you had these two alternatives. Nobody was in between.

We now seem to be very much of the view that it will end in fire. But is that so? The Millen-Culvich cycle would suggest that there are cycles of warming and cooling that are natural and have to do with the relationship to the sun, obviously.

I know a young scientist at Woods Hole who has come up with what must be the spiffiest series in the history of atmospheric science. He has got the dates on which Lake Constance has frozen every year since the 9th century. The monks used to keep the record, and now the Swiss civil service does, or for the last two centuries they have. He finds the little ice age in there. It got colder and colder and colder and the crops got scarcer and scarcer, then around the 15th century it started getting warmer and more crops, and the next thing you know, Europeans are sailing all over the world and causing all kinds of trouble.

Isn't that an area where we want to be certain to make clear the uncertainties involved? You tell me, sir.

Dr. LOEHR. No pun intended, but you have indeed hit upon a topic that, in the committee discussions, was a very warm one. But a comment in terms of what you see on the chart. You see that the global warming issue is high in terms of the ecological and welfare issues. It was ranked high in the terms that I talked about earlier, the time and space dimensionality of the problem.

This was felt to be an important problem because it takes a long time for the effect to be clear, because we should do something about—or consider doing something about—the problem before we really find a serious problem that we can no longer mitigate, and because it does affect a large number of individuals and organisms; obviously not only in the local environment, but in the global environment.

It was for those reasons that global warming it ended up high on the list of Board members who were looking at the ecological issues. You are correct, and we understood the uncertainties in-

volved, but it was felt that it was high enough to consider as a large environmental problem, to begin to address those issues again and again more sharply until we reduce the uncertainties and understand it much better.

Senator MOYNIHAN. Okay. Not to be frivolous, but there was an English skeptic in the 19th century who suggested that a sign be put up in the portals of all those cathedrals which simply said, "Important if true."

[Laughter.]

Senator MOYNIHAN. You might want to take it—

Dr. LOEHR. It was that particular point, I think, that was an undercurrent of what we were talking about. It was felt that this was important enough to be able to look at to decide if it's true.

Senator MOYNIHAN. I've got just a few more questions, if you can stay with us just a little bit longer.

I guess this committee needs your counsel, sir, about hazardous and toxic wastes. Your Science Advisory Board has described it as medium to low. The public obviously thinks it is high, and this is a matter which the Senator from New York has to pay attention to, because the whole Superfund program begins at Love Canal at Niagara County in New York, in the city of Niagara Falls.

We have been at it for a decade now, and we have spent a lot of money. I don't think we know what we've gotten for it. We don't get very good returns from the agency. I would hate to find out—I think we have to find out—just how much of that money, that billion dollars a year or whatever it is we spend, how much goes to legal fees. I think it would chill your blood. Just the litigation and fussing around and the digging up and moving stuff around, not changing anything— we had thought by now we would be into a process where, as you teach in your course down in Texas, we would have less and less toxicity entering the stream, and would have found ways to demolish or destroy that which is already out there. We don't seem to have done much of either.

Do you know what I'm saying?

Mr. REILLY. I do, indeed. And I think the frustration that you have felt, and all those involved in the program, is justified.

The role of science in the Love Canal history is itself a pretty instructive one—

Senator MOYNIHAN. It's pretty discouraging.

Mr. REILLY. It's not impressive.

Senator MOYNIHAN. Shall I put it to you and see if you agree, that we have not learned anything about the health effects of the Love Canal experience? Would you agree?

Mr. REILLY. Well, I think I would say that we have spent many, many millions of dollars with very little effect.

Senator MOYNIHAN. Very little. Very little. If ever there was a natural experiment right in front of you, there it was.

Mr. REILLY. And we've seen alarms and levels of concern rise—even panic in some places—as a result of publicity attending some sites.

Let me just say that I think it's important to put it in perspective to recognize that we are, after all, cleaning up after a very long period of abuse and neglect. This goes right back in some cases to the beginnings of the Industrial Revolution, the patterns

and practices that have developed and that have had the results that we know of.

Secondly, we are dealing with a resource that we can't see. We don't know even when we've fully solved the problem. It's difficult to be absolutely certain of that, and you have to drop a lot of wells at different distances from the point of pollution, and at different depths, and hope we do.

Third, the program itself is a program that was founded on the concept of assessing the responsible parties for their liabilities, and that has certain consequences. That means that everything has to be done twice or three times to make sure that the evidence stands up and the clear attribution of responsibility can be upheld in court.

As a result, a wholly disproportionate amount of the resources under that program have in fact gone to transaction costs and to lawyers and to consultants and the like.

I would say that last year, more than ever before, we did in fact go to cleanup. We have moved much farther, and we've gotten a much higher private party contribution, I think $1.3 billion, to supplement the Federal cost of $1.5 billion or so. So we are changing that picture somewhat, and we have set records for enforcement in Superfund that I think have communicated—this is in response to a policy I set of enforcement first—that is communicated to the community of lawyers that advise responsible parties, that there are advantages in settling, and that's why we got a record number of settlements last year.

Senator MOYNIHAN. There is a prize for the person who can get lawyers to believe that there are advantages in settling. If you can do that, you'll win it.

Mr. REILLY. We have gotten far more settlements than have ever gotten before. I think we have to continue to look at ways to make that program more effective. Very happily, with the reauthorization that occurred in the closing hours of the last Congress, we have the time to do that now. We're not doing it and wondering if people are going to be without a job if the taxing authority expires.

There are some interesting thoughts and ideas that have been proposed that we will want to consider.

Senator MOYNIHAN. We will be hearing from you on that?

Mr. REILLY. Yes, indeed.

Senator MOYNIHAN. In that matter, just to close, unless Senator Lieberman has some other thoughts, in those closing hours we passed the Clean Air Act. We estimated that the acid rain controls will be costing in the neighborhood of $20 to $25 billion a year. In section 812 of the Clean Air Act, we specified that there would be a benefit cost analysis for the whole Act.

Could you give us just some interim report on how you're setting up to do that? You've never had to do that before, but you want to do it. How long do you think it will be before it is in place?

Mr. REILLY. Just last week, right on schedule, we released a Clean Air Act implementation plan. It includes a Clean Air Advisory Committee, an Acid Rain Advisory Committee; it sets out the milestones and the objectives that we have. We are proceeding to do as much as we can by regulatory negotiation, hoping to get some consensus before we issue the regulations, and possibly avoid

the lawsuits that take place in four out of five of our regulatory decisions.

We are looking forward to continuing to monitor. We're going to work with Michael Deland, who is the new chairman of the National Acid Precipitation Committee, to make sure that we do in fact measure the benefits and the costs of our acid rain program. You mentioned the figure of $25 billion per year. I would point out that that was the figure that was considered the maximum in the outyears for the entire country to deal with the requirements of the new Clean Air Act. The figure for acid rain on the high end was about $4 billion a year.

The emissions trading program, which is in many ways the most imaginative and probably the most complicated part of that, is going to reduce those costs by about $800 million to $1 billion a year when the program is finally implemented fully.

But we are fully aware that this is a complicated and difficult and challenging job. We've got to get regulations out about five times faster, I think, than we ever have before, and we are committed to fulfilling the promise that that statute brings us.

I might say that I have been distressed that recently we have seen some publicity—a bit revisionist—that attempts to call into question the priority that the country gave to acid rain, or the scientific validity or bases for it. As you well know, the science that underlies that policy probably exceeds by a whole lot that in virtually every other area of public policy that I can think of. Ten years of research has gone one. It fully documented and validated that we have a very serious problem; 2,500 miles of acidified streams, a very large number of acidified lakes, particularly in the Adirondacks, 14,000 acidified lakes in Canada.

There is a very serious problem, and other parts of the country would have been affected, were we not to see a reduction in sulfur dioxides, the precursors to acid rain, that the Clean Air Act now will achieve for us. So it's a vitally important problem. The President called on the country to correct it, and we're doing so. Other countries— Germany did so before us in less time and at more expense and with more ambitious reduction objectives.

I think that all of us at EPA are certainly very confident that that was a correct choice, the acid rain title. It is very important and invaluable for the future of ecology, and also health and property protection, particularly in the northeast, and it is overdue.

Senator MOYNIHAN. And a good case for the argument not to be afraid of science, which is maybe a little bit of a problem that we've had in the past.

Mr. REILLY. And a good case lately, don't misuse it, either.

Senator MOYNIHAN. Don't misuse it.

We are enormously heartened by this direction which you are taking the agency, sir! We are with you. We want to hear from you, and we will consider this the beginning of a process. It is the beginning of a new Congress, and I hope it will define the next stage in this whole field of public policy.

Professor Loehr, the public never says thanks very well, but as well as we can on this simple occasion we would like to thank you and all of your associates who have worked at this matter. You do

not, unfortunately, have the same billing rates that those lawyers do.

[Laughter.]

Senator MOYNIHAN. Most of what you do is not understood, but let us be clear that it is appreciated.

Senator Lieberman.

Senator LIEBERMAN. Nothing further, Mr. Chairman, except to thank you and Mr. Reilly and Dr. Loehr for an extremely thoughtful and helpful discussion. I look forward to working with you.

Senator MOYNIHAN. The questions will be coming to you and Senator Symms has some.

[Responses to additional questions were not received in time for publication.]

We thank you very much. We thank our guests and we look forward to the next time you are with us.

Mr. REILLY. Thank you, Mr. Chairman.

Senator MOYNIHAN. We thank our reporter and we thank all.

[Whereupon, at 11:51 a.m., the committee was adjourned, to reconvene at the call of the Chair.]

[Additional statements submitted for the record follow:]

TESTIMONY OF
WILLIAM K. REILLY
ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

JANUARY 25, 1991

Good morning, Mr. Chairman. I am delighted to come before you to speak about a subject of great interest to all of us: our collective responsibility to protect the environment.

The occasion for today's hearing is a report which I requested from EPA's Science Advisory Board when I first became Administrator. The current report was presented to me in September. It is called Reducing Risk: Setting Priorities and Strategies for Environmental Protection. This important report has a great deal to say about our environmental agenda. I hope that this report will stimulate a robust public dialogue on our nation's environmental priorities and strategies.

Professor Raymond Loehr, Chairman of our Science Advisory Board (SAB) and Co-chairman of the SAB committee which undertook this effort, has described the report for you. The members of this committee may have already taken the opportunity to look at the report.

Indeed, before proceeding further, I want to thank again Professor Loehr, his co-chair Jonathan Lash, and the panel of 39 distinguished scientists, engineers and other technical experts.

They have produced a thoughtful and significant contribution to the debate on the future of environmental protection in this country.

My goal in speaking to you this morning is twofold. I want to tell you about my initial reactions to this report and what we are doing along the lines it suggests. But even more important, I want to engage you and your colleagues in the public discussion we are seeking, for of all the audiences this report is intended for, among the most crucial is the Congress. You have obvious say over the mandate, the commitments, and the resources that this country devotes to environmental protection.

I am calling for this public discussion because our national environmental priorities and strategies are not just the business of EPA. The role of other federal agencies, public and private organizations, and individuals is of enormous significance.

You know the litany of environmental problems as well as I do: smog in our most populated communities, pesticide residues in food, abandoned drums of hazardous waste in every state of the Union, stratospheric ozone depletion...the list goes on and on.

As EPA enters its third decade, it is an opportune time to take stock. We and the nation can look back at the considerable progress already made on many problems and we can look ahead at the challenges before us. As we do, we need to ask ourselves some fundamentally important questions: How can our society cost-effectively use its resources to maximize benefits to human health and to the planet that sustains us? More specifically, are we spending these resources on the right things? Are we applying the

best strategies to address the priority problems? In short, we need to consider our mission, our focus, and our methods.

The questions asked are particularly difficult to answer in today's world. Why?

- We at EPA have multiple statutory mandates and there are other laws directed at other agencies and departments that affect the environment as well. The elements of this patchwork while well-intentioned, are often inconsistent and sometimes even in conflict with one another. Therefore the overall environmental results are often less than they could be and cost more than they should.
- Every day we learn something new about the environment and the effects of pollution. Not long ago, for instance, we didn't know very much about underground storage tanks or ozone depletion. Our comparative ignorance can unintentionally lead to too much or too little regulation. The environment itself is changing. We are destroying critical habitats on a regular basis, and natural processes are also slowly changing the face of our planet.
- And finally, public concerns are constantly changing, demanding that we make everything a top priority. You are familiar with the "chemical of the week" syndrome.

In short, we need a set of principles to use as a compass as we sail through turbulent waters. We know that we can not make everything our number one priority. We know that we have achieved

some tangible results through past approaches but increasingly we are persuaded that these past approaches can be improved through the application of appropriate general principles. When President-elect Bush asked me if I would take the job I now hold, these questions were on my mind. And so, too, was your advice, Senator Moynihan, from that first meeting I had with you. "Above all," you said, "above all, don't let your Agency be transported by middle-class enthusiasms!" I have quoted you widely, Mr. Chairman, in making the point that this Agency must ground itself on solid science.

In preparing for my position, one source I drew on was a pathbreaking 1987 report commissioned by my predecessor, Lee Thomas. He instructed EPA's in-house scientists and environmental managers to look at the problems the Agency deals with and try to rank them based on risk. Risk is a common denominator that helps us distinguish the big environmental problems from the small ones. Using estimates of risk is a way of bringing science to bear on important questions. The result of that bold, visionary effort was a report which many of you have seen, Unfinished Business: A Comparative Assessment of Environmental Problems.

That report not only ranked environmental problems on the basis of risk, but it also revealed that expert and public opinions about the seriousness of many environmental problems differ markedly. In the words of the report, "EPA's priorities appear more closely aligned with public opinion than with estimated risk." Not

surprisingly, our laws are a better reflection of constituent opinion than scientific judgment. An obvious conclusion is that we need to facilitate communication between scientists and the public.

When I arrived at EPA, one of my first actions was to ask EPA's Science Advisory Board, a distinguished and objective panel of independent scientists, engineers, and other technical experts, to review Unfinished Business, assess its rankings applying the best technical and scientific knowledge available, and suggest ways to improve the comparative risk assessment process. I also asked them to extend the original analysis and to identify risk reduction strategies that could be particularly effective for specific problems, or that could help to mitigate many problems at the same time.

The Board's report, Reducing Risk, builds on the pioneering work of Unfinished Business and then goes further to spell out a set of fundamental principles for achieving broader, more integrated, more carefully targeted environmental policy-making. Taken together, these principles will help EPA develop a basic framework for addressing some of the daunting environmental problems of the 1990's and beyond.

The Reducing Risk report consists of a short and highly readable overview and three detailed appendices. There is a lot in them. Without going into detail about each of the findings and recommendations in the report, I would like to reflect briefly on the major points.

Although some of these points may have a familiar ring to them, I recommend these volumes to you and your staff for several reasons. This report comes from a distinguished group of outsiders, who were free to say what they wanted. While many of their recommendations are not completely new, they are not all universally accepted and indeed imply important changes in the way this Agency and the many sectors of our society are accustomed to doing business. We do not necessarily accept them unequivocally, or to the exclusion of what we have learned through our own experience as an agency, or as part of a broader federal family. Nonetheless, these recommendations, taken together, constitute a compass or a framework to guide us. The report also contains much technical detail backing up these recommendations, giving us many useful ideas on how to apply the general advice. And finally, while we at EPA are already doing some of the things that the report suggests, we cannot do the job alone. We need your help and the help of many others.

The report's first and most basic recommendation reflects the point I have made several times this morning: We must do a better job of setting environmental priorities. We - EPA and the nation at large - must locate and focus our attention on the most promising opportunities for reducing the most serious risks to the environment and to human health and welfare.

To help us move toward this goal, the SAB carefully reviewed the risk comparisons in the Unfinished Business study. Their conclusions were similar in many ways to the original study. Within

the constraints of the limited information and analytical methodology now available - and we clearly need to do a great deal of work to improve both - the Board identified several problems that appear to continue to pose relatively high risks to human health or the environment despite the progress of the last two decades. The human health risks highlighted in the report, based primarily on overall degree of direct public exposure to known toxic agents, are ambient air pollution, worker exposure to chemicals in industry and agriculture, indoor air pollution, including radon and other pollutants, and drinking water contamination. Additional data, which EPA is now working to gather and analyze, may reveal that other problems also pose relatively high risk.

The report also identifies specific high-risk ecological problems, based especially on their geographic scope and the amount of time it will take to reverse them: habitat alteration and destruction, species extinction and loss of genetic diversity, stratospheric ozone depletion, and global climate change.

The report further recommends that we address ecological risks with the same level of effort that we have devoted in the past to human health risks. This is in recognition of the intimate relationship between vital, productive natural ecosystems and human well-being.

Let me be clear: the Science Advisory Board is not suggesting, nor am I, that currently mandated measures to address environmental problems not cited as high risks, such as hazardous wastes, should

simply be abandoned. It is important to recognize that both Unfinished Business and this new SAB analysis make the assumption that current regulatory programs are in place and operating. EPA is, in fact, firmly committed to continued, aggressive enforcement of the environmental laws already on the books, as evidenced by our recent enforcement figures.

With the cost of environmental protection now over $100 billion a year (in today's dollars) and rising, some say we must choose between a healthy environment and a healthy economy. Yet you and I know that we must pursue both, for they are inextricably linked.

The results of this study are particularly interesting when examined side by side with another study being completed by our economists. Nationwide expenditures for pollution control, to meet standards currently on the books or future standards that can be reasonably expected, are anticipated to increase by 85% (in real terms) from 1987 to the year 2000. By far the largest portions of that increase are slated for environmental problems that do not rank as high on the risk scale as many other issues. Many of the groundwater protection issues, such as underground storage tanks, for example, fall in this category.

Similarly, I do not want to minimize the importance of other problems that were not ranked high, such as oil spills. These problems can cause real damage where and when they occur. I know. I saw Prince William Sound after the Exxon Valdez spill. But they are typically in a different league compared to some of our other

problems, such as stratospheric ozone depletion and climate change, which have the potential to affect life everywhere, and for many years to come.

The point here is that we need to think carefully about where our limited resources can be spent most effectively and efficiently. The SAB stresses that, particularly in the area of human health, additional data are needed before definitive rankings are possible for many environmental problems. Also, risk is not the only criterion that we need to consider. Costs, technology, the speed with which measures can take effect, public concerns, legislative mandates, and other factors must all be taken into account.

Yet when we think about setting priorities there are some questions we cannot escape: Shouldn't we as a society focus our resources where there are the greatest opportunities for risk reduction? How much should we spend on environmental problems that may be serious in one area or another but appear to be relatively low-risk to the population as a whole? How much do we spend on those problems which pose greater overall risks? How in a democracy do we balance public demands for action to reduce risk and protect the environment with professional judgments about how best to achieve these goals? These are important questions for you as legislators, as well as for us as program implementers, to consider.

For our part, we are fully engaged on these issues. As the new report was released in September, I spent several hours discussing

it with over two hundred of the Agency's top executives. While we all acknowledged how difficult some of these changes could be to implement, I heard considerable enthusiasm for the task.

This year our program offices have been developing 4-year strategic plans which attempt to focus agency efforts on high-risk problems and strive to maximize risk reduction potential. We believe that risk-based planning is so important that we will devote a major portion of our annual planning meeting, to be held in late February, to discussing this subject. In addition, we are working to assure that priorities set in strategic plans are reflected in program budget requests.

We are also giving more attention to ecological protection in all our programs, from municipal wastewater to toxic air pollution. An example of our increased recognition of ecological problems is our reinvigorated initiative to clean up the Great Lakes. We need to do more for ecological protection.

A second basic principle discussed in the Reducing Risk report is that how we spend our resources is as important as what we spend them on. The traditional approach to environmental protection - prescriptive, command-and-control regulations - has brought us a long way. But we are probably reaching a point of diminishing returns with this approach. By themselves, technology-based regulations are no longer the best tool to complete the job before us. In some cases, they can actually be counterproductive, inhibiting innovation, discouraging regulated industries from going

beyond minimum legal requirements, or costing society more than is necessary to achieve environmental objectives.

These limitations are particularly evident in emerging areas of concern - problems ranging from pollution in the household and pesticide residues in food to threats to the planet's atmosphere and climate. These problems also call for a broader, more integrated look at the range of response tools available to us. Among the tools identified by the SAB are market incentives, public information and education, research and technical assistance. Indeed, the Congress recognized the importance of economic incentives in the recently passed Clean Air legislation, which we are now working to implement. We are looking for other ways to use the full range of tools in an effective and efficient manner.

The SAB also recommended that, above all, our country recognize the need for a cost-effective national effort to prevent pollution before it is created in the first instance. Again, we agree wholeheartedly. We soon will be publicly unveiling our Pollution Prevention Strategy, which presents a blueprint for a comprehensive, voluntary national pollution prevention program. Looking at what we already have that encourages pollution prevention, it is clear that one of the most effective instruments for reducing toxic air emissions has been the Community Right-To-Know law requiring industries to estimate and publicly announce those emissions, by plant and by chemical. My hat's off to the congressional authors of this law for it has proved far more compelling and far more effective than I imagine even the strongest

advocates dared hope. The Science Advisory Board report contains numerous specific examples of different measures that EPA and others might adopt to address environmental problems. We need to consider all these carefully.

Clearly, environmental protection is not a job EPA can do by itself. All parts of government and all sectors of society must participate. The quality of the environment is directly affected by energy extraction and use, by agriculture, by transportation, by relations with other nations, by trade policies, and tax policies. The SAB stresses that government must pay much more attention to environmental considerations at the outset of policy-making. Neither the Board nor I wants EPA to get into every other agency's business. Instead, the other agencies need to be getting into our business, the business of protecting the environment. The environmentally-oriented provisions of the 1990 Farm Bill are a good example of what we need to do more often.

Other sectors of society also share environmental protection responsibilities. Our educational system needs to participate by building environmental education into curricula at all levels. As individuals, we need to make choices in our everyday lives, both as consumers and producers, that protect the environment - in the energy we use, the goods we buy, the waste we generate. Every American must feel empowered and enabled to act on behalf of the environment. As President Bush stated in the fall of 1989, "Through millions of individual decisions - simple, everyday, personal choices - we are determining the fate of the earth. So

the conclusion is also simple: We're all responsible, and it's surprisingly easy to move from being part of the problem to being part of the solution."

The SAB argues strongly that education is one of the most important tools for a long-range risk reduction strategy, and gives examples of where we need to focus attention. We have a shortage of scientists and engineers to cope with environmental problems today and in the future. Environmental education and training are also essential for business people, farmers, diplomats, public administrators, physicians and others who carry out activities which affect or are affected by the environment, as well as members of the general public. Our new Environmental Education Office, authorized last Fall by Congress, is giving us a good push in this direction. Yet most of the work will be done by those who run our educational institutions.

In thinking more specifically about environmental priorities, greater public awareness of relative environmental risks will help the nation allocate its resources to maximize cost-effective risk reduction. And, as we engage the discussion between our scientists and the public, we need to listen carefully to the priorities that people express and use them in setting our policies.

Refocusing the nation's environmental agenda will not be easy, and it will not happen overnight. Yet there are some hopeful signs. I have mentioned what we are already doing. We are also discussing this report with state environmental chiefs and seeing genuine interest. We are talking to many others - industry, environmental

groups, professional societies, and so on. We will seek more opportunities to discuss this subject. We are very conscious that we need a broad base of public and legislative support if we are to make a lasting difference.

How we make choices today will determine our environmental legacy to future generations.

Thank you.

TESTIMONY FOR MOYNIHAN HEARING
Dr. Raymond C. Loehr

I. Introduction

My name is Dr. Raymond C Loehr. For the past six years I have been the H. M Alharthy Centennial Chair and Professor of Environmental Engineering in the Environmental and Water Resources Engineering program at the University of Texas in Austin. For the eighteen years prior to that time, I taught environmental engineering at Cornell University in Ithaca, NY where I was the Liberty Hyde Bailey Professor of Engineering. My particular research interests have been in the area of hazardous and industrial waste management. In 1983 I was elected to the National Academy of Engineering.

In addition to a wide range of professional activities, I serve as the Chair of the U.S. Environmental Protection Agency's (EPA) Science Advisory Board (SAB), a position I have occupied since 1988. My current service with the SAB dates back to 1980 when I first joined the Board as a member of the Environmental Engineering Committee.Over the years I have participated in a great many SAB activities, each designed to provide sound technical and scientific advice to the EPA Administrator.

Today, I want to discuss one of the Board's most important and far-ranging reports: Reducing Risk: Setting Priorities and Strategies for Environmental Protection (EPA publications #EPA-SAB-EC-90-021 and its three appendices #EPA-SAB-90-021A; -021B;

and -021C [Exhibits 1-4]). My testimony will focus on the SAB organization, the events surrounding the preparation and release of Reducing Risk, and the contents of the report.

II. The Science Advisory Board

In 1978 Congress mandated that EPA establish, under the Federal Advisory Committee Act (FACA), a group of highly qualified, independent (non-governmental) scientists and engineers to provide objective advice to the EPA Administrator on the scientific soundness of the technical and scientific basis for the Agency's rules and regulations. The SAB currently consists of 60 members, supplemented by over 200 consultants, who apply their technical talents to examining a wide range of scientific issues. The activities of the Board are coordinated by an Executive Committee, of which I am the Chair. The members are distributed among eight permanent committees that conduct 50-60 meetings per year and produce roughly 30 reports each year. Additional details about the SAB can be found in the Report of the Staff Director (Exhibit 5).

In general, the SAB restricts its inquiries to the strictly technical and scientific issues surrounding environmental questions. Issues of "risk management", to use the language of the National Academy of Science (NRC, 1984), are generally beyond the scope of SAB activities.

In some instances, however, the Board is invited to examine an issue and to render its technical and scientific perspective on the matter under discussion. This has been true in two major

SAB reports released during the past four years: 1) Future Risk: A Research Strategy for the 1990s and 2) Reducing Risk: Setting Priorities and Strategies for Environmental Protection. It is the latter report that I want to address today.

III. Events leading up to Reducing Risk

A. Background

Twenty years after the founding of EPA, the U.S. finds itself confronted with a changed set of challenges. In contrast to 1970, we now have an increased base of knowledge about and experience with the environment and its problems. This base provides us with the information to make smarter choices about how to deal with the remaining and emerging environmental problems.

Thanks to aggressive action on the part of the public and private sectors, the environmental problems of today are significantly different from those we confronted two short decades ago. In place of belching smokestacks and rivers that catch fire, we must now address less photogenic problems that continue to linger (e.g., lead contamination) and that were unheard of in 1970 (e.g., the "ozone hole").

Increasingly, we recognize that there are limitations to the resources available to address these remaining and emerging problems. Therefore, it is incumbent upon us to "work smarter" by targeting those resources where they will do the most good; i.e., result in the greatest reduction of environmental risk. All of this must be done in a climate characterized by increasing

public concern about environmental problems and increasing expectations that those problems should and will be eliminated. Rarely does the public make a distinction about the relative importance of environmental problems, preferring instead, action on all of the problems that exist. However, it is important to set priorities among legitimate environmental needs and to adopt strategies that will improve the environment in the most effective ways.

B. The request for the Reducing Risk project

It was in this climate of increasing demand and expectation that in 1986 the Administrator, Mr. Lee Thomas, asked 80 career people in the Agency to work together to identify the most important remaining and emerging environmental problems. Further, after identifying these problem areas, the professionals were asked to rank them in four different ways: in terms of the relative risks they posed for 1) carcinogenic effects in humans, 2) non-cancer effects in humans, 3) ecological effects, and 4) welfare effects. The results of that study were released in the Unfinished Business (UB) report in 1987 and generated considerable discussion within EPA and attracted significant attention outside the Agency.

When Mr. William Reilly became EPA Administrator, he quickly became interested in the UB report and its potential as a tool for guiding Agency action. Therefore, in the spring of 1989, he asked the SAB to apply its technical and scientific expertise to critiquing the UB report and suggesting options for

reducing some of the highest ranking environmental problem areas.

C. The response of the SAB

The SAB accepted the invitation, following some initial reluctance on the part of some of the members.There was some concern that the project would take the Board more into the "risk management/policy" areas than was desirable. In the end, however, the Board embarked on a project that they defined via the following Goal Statement:

> "To provide decisionmakers and the public with the best technical and scientific knowledge available on the relative risks posed by different environmental problems and the options to reduce these risks."

In addition, they defined their charge as having four elements:

1. Provide a critical review of the UB report and add any new information which had become available since the original report in 1987.
2. Evaluate the health and environmental risks posed by major environmental problems.
3. Provide options strategies for reducing the major environmental risk areas.
4. Develop a long-term strategy for improving the assessment and ranking of risks and for assessing alternative risk reduction strategies.

Having accepted the challenge, the SAB moved quickly to organize itself to complete the job. The project was overseen by

the Relative Risk Reduction Strategies Committee (RRRSC), which reported directly to the Executive Committee (EC). I served as co-Chair of the RRRSC, along with Mr. Jonathan Lash, then Secretary of Natural Resources in the State of Vermont. The membership of the RRRSC included 11 of the most talented people in the country in dealing with environmental problems and reactions to them.

The RRRSC was supported by three subcommittees:

a. Human Health Subcommittee (HHS)

Chair: Dr. Arthur Upton
New York University
Former director of the
National Cancer Institute

b. Ecology/Welfare Subcommittee (EWS)

Chair: Dr. William Cooper
Michigan State University
Chairman of the Department of Zoology

c. Strategic Options Subcommittee (SOS)

Chair: Mr. Alvin Alm
Scientific Applications International Corp.
Former Deputy Administrator at EPA

In all, the Reducing Risk effort involved 39 qualified individuals from across the country. These experts included individuals from the academic community, the industrial community, the environmental community, and the community of State regulators. In conformance with FACA, none of the members

were Federal employees and all of the meetings were conducted in public session.

IV. The Reducing Risk report

After nearly a year and half of work that involved more than a dozen public meetings, the SAB presented Mr. Reilly with its Reducing Risk report in September, 1990. The report consists of a short, printed "overview" report, supplemented by three appendices, one from each of the subcommittees.The subcommittee reports are rich in analysis, options, and recommendations. The overview report, which is the focus of my remaining remarks, is a product of the parent committee and is more than simply a summation of the contributions of the three subcommittees.

A. Findings

In process of conducting its study, the SAB made eight specific findings that summarize the Board's assessment of the problem we were asked to consider. Some of the findings are answers to questions imbedded in the charge to the Board. Others were discovered in the course of Committee activities and are more general in nature. Both types of findings provide valuable insights for understanding the environmental problems we face in the 1990s.

1. The importance of Unfinished Business

The SAB found that the Agency's Unfinished Business report was a bold and much-needed step directed at comparing the risks of different environmental problems and suggesting an important shift in national environmental policy. While they

found many areas in which the analysis could be improved (e.g., the definition of environmental problems considered and the data available to assess those problems), the SAB described the report as the first step toward a policy that attempts to match Agency and societal resources to health and environmental risks. The Board was favorably impressed by this ground-breaking effort.

2. Problems in ranking risk

The SAB identified some important shortcomings in the data and methodologies currently available for assessing environmental risks and the potential for reducing those risks. They found that as long as there are large gaps in key data sets, efforts to evaluate risk on a consistent, rigorous basis or to define optimum risk reduction strategies necessarily will be incomplete, and the results will be uncertain. The Board highlighted especially the limitations in adequately evaluating ecological resources.

3. The extraordinary value of natural ecosystems

The SAB found that the Agency has considered the protection of public health to be its primary mission, and it has been less concerned about risks posed to ecosystems. This imbalance is a manifest, if inadvertent, part of current national environmental policy.The Board finds this position to be shortsighted, emphasizing that human health and welfare ultimately rely upon the life support systems and natural resources provided by healthy ecosystems. National efforts to evaluate relative environmental risks should recognize the vital

links between human life and natural ecosystems. Up to this point, they have not.

4. Time, space and risk

In the absence of definitive data to evaluate the comparative risks posed by different environmental problems, the SAB highlighted some basic principles which can guide the identification of the most significant problems. These included consideration of the number of people and organisms exposed to the risk, the likelihood of the environmental problem actually occurring among those exposed, and the severity of the effects, including economic losses and other damages involved, if the problem does occur. In addition, the Board identified time and space--the temporal and spatial dimensions--as two important factors useful in separating the greater from the lesser risks. For example, although all environmental problems are likely to be of legitimate concern, those problems that are widespread (e.g., global vs. local) and resistant to "quick fixes" (e.g., slow recovery of an ecosystem from exposure to long-lived chemicals vs. quick rebound to a normal state following removal of pollution) may be of greater importance.

5. The links between risk and choice

Twenty years ago pollution was generally viewed as a problem "they" (usually industry) created. We have now evolved in our thinking about environmental protection to realize that sources of risk often are to be found in the day-to-day choices made by individuals, communities, and businesses. These risks

will not be reduced substantially, especially over the long term, if past patterns of individual community and business choices do not change in light of the relative risks posed by those choices.The SAB identified a variety of factors that effect those choices; e.g., education, ethics, economic incentives, laws, and regulations. The Board concludes that economic growth and reductions in environmental risk are not necessarily incompatible, if past patterns of choice can change.

6. Public perceptions of risk

The SAB found that many of the remaining and emerging environmental risks considered most serious by the general public today are different from those considered most serious by the technical professionals charged with reducing environmental risk. This dichotomy poses a challenge to the Agency in responding to the expressed desires of the public, on the one hand, and in effectively administering limited resources, on the other.The Board does not conclude that the public is "wrong"; simply that their views are different, incorporating as they do, deeply-held subjective values, like justice and equity, in addition to some level of technical understanding of the problems. The SAB urges EPA to listen carefully to the public's perception about risk, balancing and re-balancing those views against the evolving technical knowledge about the range of environmental problems.

7. Relatively high risk environmental problems

Faced with significant gaps in the available data and methodologies for comparing risks, the Board nonetheless felt it

was important to make some attempt to identify those environmental problems that might pose particularly high risks.

The Ecological and Welfare Subcommittee relied primarily on the criteria of time and space (See Finding 4) in identifying four relatively high risk problem areas:

Habitat alteration and destruction

Species extinction and overall loss of biological diversity

Stratospheric ozone depletion

Global climate change

The Human Health Subcommittee felt more constrained by the data limitations in their area of concern. However, based upon the criteria of direct human exposure to known toxic agents, they identified the following as likely areas that would pose relatively high risks:

Ambient air pollutants

Worker exposure to chemicals in industry and agriculture

Pollution indoors

Pollutants in drinking water

In addition, this Subcommittee felt that a) pesticide residues on food and b) toxic chemicals in consumer products also have the potential of significant exposures (and risks) to large populations, although the data bases to support those concerns are not as robust as the four problems listed previously.

8. Strategy options for reducing environmental risk

In addition to reviewing Unfinished Business, the Board reviewed a broad spectrum of policy options available for

reducing major environmental problems. Six generic risk reduction tools were identified that should be considered for any problem area. These tools were used to generate 60 specific examples of options that could be applied to 13 particular environmental problems. Criteria which could be used in selecting from among the various risk reduction options in any particular case were also recommended. The six tools are

Scientific and technical measures

Provision of information

Market incentives

Conventional regulations

Enforcement

Cooperation with other government agencies and nations

B. Recommendations

Based upon these eight findings and the more extensive reports of the subcommittees, the parent committee forged 10 recommendations that the Board presented to the Administrator--and the nation--for their consideration and implementation.

1. EPA should target its environmental protection efforts on the basis of opportunities for the greatest risk reduction.

Since this country already has taken the most obvious actions to address the most obvious environmental problems, EPA needs to set priorities for future actions so that Agency takes advantage of the best opportunities for reducing the most serious

remaining risks. This recommendation is an affirmation of the comparative risk analysis approach initiated in the Unfinished Business report. EPA should take a larger view of its mission of environmental protection. Over the past twenty years the greater vision of a young, vigorous EPA has given way to a narrower picture of a maturing agency running its programs. Simply stated, in the view of the SAB, EPA is responsible for protecting the environment, not just for implementing environmental law. Thus, the Agency should assess and compare the universe of environmental risks and then take the initiative to address the most serious risks, whether not Agency action is required specifically by law.

2. EPA should attach as much importance to reducing ecological risk as it does to reducing human health risk.

Because productive natural ecosystems are essential to human health and to sustainable, long-term economic growth, and because they are intrinsically valuable in their own right, EPA should be as concerned about protecting ecosystems as it is about protecting human health.From a technical perspective, there is a close linkage between human health and ecological health: you cannot have a healthy population in the long term without a healthy ecology, and you cannot have a healthy economy in the long term without a healthy population.These close linkages should be reflected in national environmental policy. Therefore, EPA's risk-based priorities for action should reflect an

appropriate balance between ecological, human health, and welfare concerns. Furthermore, the Agency should communicate to the general public a clear message that it considers ecological risks to be just as serious as human health and welfare risk, because of the inherent value of ecological systems and their strong links to human health.

3. EPA should improve the data and analytical methodologies that support the assessment, comparison, and reduction of different environmental risks.

Although setting priorities for national environmental protection efforts always will involve subjective judgments and uncertainty, EPA should work continually to improve the scientific data and analytical methodologies that underpin those judgments and help reduce the uncertainty. There are questions associated with limitations in the database itself; e.g., what is the distribution of toxic chemicals in the environmental and what are the risks that remain undiscovered? In addition, there are fundamental questions in comparing risks; e.g., how does one compare risks which are qualitatively different from one another (cancer vs. non-cancer effects, and human health risk vs. ecological risk)? Further, we have just begun to work out systematically those questions that relate to methods for reducing risk; e.g., what is the full range of options available for addressing a particular environmental problem? Unfinished Business took the first steps to compare environmental risk; the appendices to this report describe more sophisticated approaches.

EPA should ensure that these ideas are developed and tested in the years ahead, so that relative risk reduction can be used as an effective, continually evolving tool in the development of national environmental policy.

4. EPA should reflect risk-based priorities in its strategic planning processes.

The Agency's long-range plans should be driven not so much by past risk reduction efforts or by existing programmatic structure, but by an ongoing assessment of remaining environmental risk, the explicit comparison of these risks, and the analysis of opportunities available for reducing risks. EPA should consider soliciting the input of external groups and individuals with expertise and interest (both technical and lay) in setting this environmental agenda. This type of comparative risk analysis has been conducted successfully in a number of states and communities around the country. Such efforts should be augmented and supported in the future. Further, a major relative risk reduction review should be conducted on a national basis every several years. This exercise would include a disciplined analysis of the full range of strategy options (see finding #8) available to address the major problems.

5. EPA should reflect risk-based priorities in its budget process.

Although EPA's budget priorities are determined to a large extent by the different environmental laws that the Agency implements, it should use whatever discretion it has to focus

budget resources on those environmental problems that pose the most serious risks. Such risk-driven changes in the budget need not occur overnight. Small, but consistent, changes would accomplish the same objectives and would parallel the Agency's improving proficiency in the analysis of relative risk. On a broader front, EPA should take the lead in ensuring that overall national efforts to reduce environmental risks are driven by cost-effective risk reduction strategies. As activities by organizations outside of EPA--at the Federal, State, and local levels--become increasingly important to the nation's risk reduction efforts, the Agency should guide, inform, and help coordinate those efforts, by sharing its most up-to-date, comprehensive understanding of relative environmental risks and the options available for reducing them.

6. EPA--and the nation as a whole--should make greater use of all the tools available to reduce risk.

Although the nation has had substantial success in reducing environmental risks through the use of government-mandated end-of-pipe controls, the extent and complexity of future risks will necessitate the use of a much broader array of tools, including market incentives and information. Continued use of command-and-control regulations, coupled with effective enforcement, is critically important for maintaining and furthering the progress this nation has made on a great number of environmental problems. However, to address many of the remaining and emerging environmental problems, EPA should

take the lead in examining and applying, as appropriate, more innovative, cost-effective risk reduction strategies. The Agency should make more of an effort to inform and encourage other elements of society; e.g., businesses, schools, State and local governments, to use this broader range of tools.

7. EPA should emphasize pollution prevention as the preferred option for reducing risk.

By encouraging actions that prevent pollution from being generated in the first place, EPA will help reduce the costs, intermedia transfers of pollution, and residual risks so often associated with end-of-pipe controls. History has shown us (e.g., at Department of Energy nuclear weapons plants and innumerable Superfund sites) that after-the-fact cleanup costs can be enormous. Thus, end-of-pipe controls and waste disposal should be the last line of environmental defense, not the front line. In many instances pollution prevention is the only alternative for addressing effectively significant residual risks that remain after maximizing end-of-pipe controls. Increasingly, the nation is becoming aware of the benefits--including economic benefits--attached to a pollution prevention strategy and of the fact that other countries, who are our economic competitors, have made considerable progress in this area. Therefore, EPA should take the lead in encouraging, demonstrating, and adopting pollution prevention as the strategy of choice.

8. EPA should increase its efforts to integrate environmental considerations into broader aspects of public policy in as fundamental a manner as are economic concerns.

Other Federal agencies often affect the quality of the environment; e.g., through the implementation of tax, energy, agricultural, and international policy, and EPA should work to ensure that environmental considerations are integrated, where appropriate, into the policy deliberations of such agencies. Many of the remaining and emerging environmental problems involve dispersed sources of pollution governed by activities and behaviors not directly or solely affected by Agency legislative mandates; e.g., habitat destruction, indoor air pollution, non-point source water pollution, and elimination of forests on a global scale. In order to facilitate the government-wide integration of environmental policy, the EPA Administrator should encourage the President to create a cross-government forum where such integration would be explicitly considered and carried out.

9. EPA should work to improve public understanding of environmental risks and train a professional workforce to help reduce them.

The improved environmental literacy of the general public, together with an expanded and better-trained technical workforce, will be essential to the nation's success at reducing environmental risks in the future. EPA should work to reduce the

gap between public perceptions of risk and the scientific understanding of risk, in part, by sharing information on the relative risks posed by different environmental problems. The Agency should include broad public participation in its efforts to rank environmental risks. In addition, EPA should take the lead in helping the nation confront the growing shortage of environmental scientists and engineers needed to cope with current and future environmental problems. As the nature of the problems continue to change, the existing professionals need continuing education and training to help them understand and use the complex control technologies and pollution prevention strategies needed to reduce environmental risks more effectively. EPA has a responsibility to address this problem.

10. EPA should develop improved methods to value natural resources and to account for long-term environmental effects in its economic analyses.

Because traditional methods of economic analysis tend to undervalue ecological resources and fail to treat adequately questions of intergenerational equity, EPA should develop and implement innovative approaches to economic analysis that will address these shortcomings. Since many of our actions are impacted by economic considerations, it is important that the techniques employed in such analyses account for environmental assets in an appropriate manner. This is not currently the case. As a first step, EPA should commission a study that surveys the ideas of ecologists, economists, social scientists, and other

experts from inside and outside the Agency. The study should attempt to develop a way of incorporating ecological investments into a concept of sustainable growth. Environmental economics is a controversial, complex, and rapidly-evolving field.EPA should take the lead in developing methods of analysis that will give fair consideration to investments that will protect the natural resource base for future generations.

V. Closing

This concludes my prepared testimony. I would be happy to address any questions and comments you might have.

CHEMICAL
MANUFACTURERS
ASSOCIATION

WRITTEN STATEMENT
OF THE
CHEMICAL MANUFACTURERS ASSOCIATION

BEFORE
THE SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE

ON THE ENVIRONMENTAL PROTECTION AGENCY
SCIENCE ADVISORY BOARD REPORT
"REDUCING RISK: SETTING PRIORITIES AND STRATEGIES
FOR ENVIRONMENTAL PROTECTION"

FEBRUARY 13, 1991

2501 M Street, NW 202-887-1100
Washington, D.C. 20037 Telex 89617 (CMA WSH)

The Chemical Manufacturers Association (CMA) appreciates this opportunity to present views on EPA's Science Advisory Board report, Reducing Risk: Setting Priorities and Strategies for Environmental Protection. This testimony is presented in conjunction with the January 25, 1991, hearing on this subject by the Senate Environment and Public Works Committee.

CMA is a nonprofit trade association whose member companies represent more than 90 percent of the productive capacity of basic industrial chemicals within this country. Chemicals produced by CMA's members are essential to nearly every sector of the U.S. economy. CMA members have made a public commitment to responsibly develop, manufacture, transport, and dispose of those chemicals. Responsible Care, corporate environmental performance, and the public's perception of the industry--and its potential risks-- is a priority of every one of our members. As such, we welcome and fully support the Committee's interest in the approach described in the SAB report to establish a national environmental policy, and believe it a timely and crucial topic for the Committee to consider.

EPA Administrator William Reilly, as well as other public officials, recognize the realities this country faces--steadily improving environmental quality in some areas, unacceptable or unclear environmental risk in others, and a weakened economy that may be capable of supporting a projected expenditure of 3-4% of our gross national product on environmental protection, but not an economy that has infinite finances and resources. Environmental protection management in this country has been, and remains, piecemeal, without the legislative or administrative framework to identify priorities, act on the most severe problems first, or benefit from a comprehensive, coordinated approach across laws and regulations or programs.

Opportunities for the most effective and efficient environmental protection have not been maximized because of the way all of us, including EPA, industry, public interest groups and the Congress, have been doing business. We believe, along with many of you and your colleagues, that our current approach does not make the most sense and we simply do not have the resources, as a nation, to continue in this manner.

EPA's Science Advisory Report provides a good starting point for national policy discussions and debate on just how we do business, and what business we ought to be doing. We believe such national policy discussions, welcoming the views of all parties, is an appropriate, and necessary course of action that we must undertake. In this regard, we look forward to follow-up discussions from the January hearing, as well as future discussions with Administrator Reilly and his staff.

The Science Advisory Board undertook a sizable effort in developing an approach for establishing an integrated and targeted national environmental policy. Their approach is based on the concept of environmental risk and as they conclude, it is a tool that will help people discuss disparate environmental problems with a common language, allow environmental problems to be measured and compared in common terms, and evaluate risk reduction options from a common basis. This

tool, and its underlying methods and assumptions may be the only means by which such discussions, policies, and choices can be made. It is, at a minimum, a suggested process that all of us--including the public--can begin to work through and understand. We believe the SAB's basic concept to use environmental risk as a tool is sound and will be effective in meeting its objective to guide those involved in evaluating problems and making the right choices.

In this regard, the underlying methods for evaluating and comparing risks must consider all relevant information. However, as Senator Moynihan reminded us at the hearing, sometimes the more one knows, the more uncertain one is and consequently, the more difficult it is to make choices. This is precisely the challenge we face as responsible public officials and corporate citizens. The science in this area of environmental risk is not precise and deals with probabilities as much as certainties. We must be committed however, to using existing sound scientific data and principles, and work continuously towards and support efforts to improve the science and reduce uncertainties. We also must be committed to reevaluating our choices and changing them when new information suggests or dictates the need for change. Public policy in environmental risk can not be a static one-time-only exercise and must respond to changing information, views, and values.

Science in this area, however, is far from tentative. We can't afford to ignore it or the results of millions of dollars spent by both private and public sectors in basic and applied research. Setting aside efforts directed at basic medical research, such as on cancer, Congress directed significant resources and efforts to occur under the recently passed Clean Air Act Amendments on risk assessment methods. We strongly supported this effort, not only for the provisions addressing residual risk in Title III of that Act, but also for its beneficial assistance to all the environmental statutes that are based on potential human or environmental risk. The efforts of the National Academy of Sciences, the newly forming Risk Management Commission, and the Environmental Protection Agency study on risk assessment that Congress mandated will help to crystallize a common basis for evaluating environmental risks. There are also other efforts that complement these initiatives including those now begun within the White House's Office of Science, Technology, and Policy, EPA's Risk Assessment Council and Office of Research and Development, and the National Academy of Sciences' Committee on Risk Assessment Methodology (CRAM).

EPA, in conjunction with the American Chemical Society, is also organizing a special symposium entitled, "What Data Are Needed to Quantitatively Rank Environmental Problems According to Risk," for the 102nd ACS National Meeting in August of this year. Efforts such as these will foster further insight and discussion on the basis for a new national environmental policy. We strongly encourage this effort, and need to be reminded that, in the mean time, we must begin this difficult and necessary process. Too many times in the past, decisions calling solely for further research have resulted in a loss of public confidence, and perhaps even public protection. The public's confidence is a critical element addressed by the SAB report, and is an issue of clear importance to Congress.

Many questions have been raised concerning the apparent disparity between the scientist's view of environmental risk, and the public's perception of environmental risk. We agree that public perception--that is, public values--must be part of the process to develop any national policy. What the SAB report tells us is that the public must be provided, in a way that is meaningful and understandable, the same information available to scientists. We believe that lack of information is one root cause for disparate views. We, as the chemical industry and public officials from all areas, must work to ensure that our citizens are well-informed and knowledgeable, and that they have ample chances to contribute to this process in a meaningful way.

Thank you for this opportunity to present our views on this important issue.